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Office on Drugs and Crime

2006

WORLD DRUG REPORT

Volume 1: Analysis

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2006

WORLD DRUG REPORT

Volume 1: Analysis

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Preface

Drugs are everywhere, say alarmed parents. *The drug problem is out of control*, cries the media. *Legalize drugs to reduce crime*, say some commentators.

Such exasperation is understandable in the many communities where illicit drugs cause crime, illness, violence and death. Yet, worldwide statistical evidence points to a different reality: drug control is working and the world drug problem is being contained.

This is true whether we look over the long term or even just over the past few years. Humanity has entered the 21st century with much lower levels of drug cultivation and drug addiction than 100 years earlier. Even more importantly, in the past few years, worldwide efforts to reduce the threat posed by illicit drugs have effectively reversed a quarter-century-long rise in drug abuse that, if left unchecked, could have become a global pandemic.

The illicit drug problem has three main elements: cultivation and production; trafficking and retailing; and consumption and abuse. We do not know as much as we would like about the middle link of this chain as the drug trade is notoriously hard to monitor. But, as this report shows, we do know a lot about the beginning and the end of the chain and can confidently make two points: (1) There is less land under coca and opium cultivation today than a few years ago, and significantly less than a century ago; (2) The severity of drug addiction has been contained. The number of addicts, especially those dependent on cocaine and heroin, has declined massively over the last century and, worldwide, has remained stable in the past few years.

Of course, the world drug control system is the sum of its parts and progress in one area can be offset by opposite trends elsewhere. Greater global success will depend on the commitment of all our societies to turn *containment* of the drug problem into a sustained *reduction* - everywhere. We are not there yet.

This *World Drug Report* demonstrates progress made in 2005, but also highlights some weak elements in the global drug control system - most notably heroin supply in Afghanistan, cocaine demand in Europe, and cannabis supply/demand everywhere. The main trends can be summarized as follows.

The world's *supply of opium* has shrunk, but in an unbalanced way. Within a few years, Asia's notorious Golden Triangle, once the world's narcotics epicentre, could become opium-free. But in Afghanistan, while the area under opium cultivation decreased in 2005, the country's drug situation remains vulnerable to reversal. This could happen as early as 2006.

In the past five years, the area under *coca cultivation* in the Andean countries has fallen by more than a quarter. In order for this trend to be sustainable, richer countries – the consumers of cocaine – need to invest more in helping Andean farmers to switch to licit crops. As this report points out, demand for cocaine is rising in Europe to alarming levels. I urge European Union governments not to ignore this peril. Too many professional, educated Europeans use cocaine, often denying their addiction, and drug abuse by celebrities is often presented uncritically by the media, leaving young people confused and vulnerable.

Trends in *cocaine trafficking* are hard to assess. Cocaine seizures have increased dramatically. Markets have been thrown into turmoil due to intensified coca eradication in the Andean countries and better law

enforcement worldwide. As crime cartels look for new trafficking routes, especially towards the European Union, countries in the Caribbean, West Africa and Central Africa are under attack. They need to be assisted, not least in their efforts to tackle corrupt and ineffective law enforcement.

Cannabis, which gets special attention in this report, is the world's most abused illicit drug. Global oversight of supply is impractical as it is a weed that grows under the most varied conditions, at many different latitudes and in many countries. National policies on cannabis vary and sometimes change from one year to the next. With supply virtually unlimited and demand subject to the vagaries of government policy, traffickers have invested heavily in increasing the potency – and therefore the market attractiveness — of cannabis. The result has been devastating: today, the characteristics of cannabis are no longer that different from those of other plant-based drugs such as cocaine and heroin.

With cannabis-related health damage increasing, it is fundamentally wrong for countries to make cannabis control dependent on which party is in government. Policy swings or reversals leave young people confused as to just how dangerous cannabis is. The cannabis pandemic, like other challenges to public health, requires consensus, and a stable and consistent engagement across society at large so countries can take appropriate and long-term remedial action.

After years of rapid increases, the market for *amphetamine-type stimulants* (ATS) is stabilizing. In some parts of the world, such as the United States, methamphetamine is considered drug public enemy number one. In other regions, notably Europe, synthetic psychoactive substances have lost some of their earlier appeal and been replaced by cocaine. Seizures have skyrocketed, demonstrating once again that the popularity of drugs in some countries tends to offset their decline elsewhere, causing the market to reorganize itself. It is encouraging to see law enforcement taking advantage of the disarray among traffickers.

The *World Drug Report* is a repository of statistics and not the place to formulate policy. But the data prompt a few inescapable conclusions. *First*, countries need to do more to reduce drug demand in general and to target ATS and cannabis in particular. The profile of the users of these drugs differs from that of those who use cocaine and heroin, and treatment appropriate to their needs is still not widely available. *Second*, there is an urgent need to prevent the spread of HIV/AIDS among injecting drug users, whether they are street addicts, sex slaves, or prison inmates.

Third, while drug market trends are moving in the right direction, more work is needed to ensure that these trends will be sustained. After so many years of drug control experience, we now know that a coherent, long-term strategy *can* reduce drug supply, demand and trafficking. If this does not happen, it will be because some nations fail to take the drug issue sufficiently seriously and pursue inadequate policies. In other words, each society faces the drug problem it deserves.

Antonio Maria Costa
Executive Director
United Nations *Office on Drugs and Crime*

Introduction

The work of the United Nations Office on Drugs and Crime (UNODC) is supported by three pillars:

- Research and analytical work to increase knowledge and understanding of drugs and crime issues and expand the evidence-base for policy and operational decisions;

- Normative work to assist States in the ratification and implementation of the international treaties, the development of domestic legislation on drugs, crime and terrorism, and the provision of secretariat and substantive services to the treaty-based and governing bodies; and

- Field-based technical cooperation projects to enhance the capacity of Member States to counteract illicit drugs, crime and terrorism.

Recognizing the importance of comprehensive, factual and objective information in the field of international drug control, the General Assembly entrusted UNODC with the mandate to publish "comprehensive and balanced information about the world drug problem" in 1998.

UNODC has published such assessments annually since 1999. The year 2004 saw the consolidation of the former *Global Illicit Drug Trends* publication and the *World Drug Report*, published in a two-volume edition. The first volume provides an analysis of the global situation and of the four main drug markets, the second volume compiles detailed statistics. Together they provide the most complete picture of the world drug problem.

As in previous years, the present report is based on data obtained primarily from the annual reports questionnaire (ARQ) sent by Governments to UNODC in 2005, supplemented by other sources when necessary and where available. Two of the main limitations herein are: (i) that ARQ reporting is not systematic enough, both in terms of number of countries responding and of content, and (ii) that most countries lack the adequate monitoring systems required to produce reliable, comprehensive and internationally comparable data. National monitoring systems are, however, improving and UNODC has contributed to this process.

As part of the ongoing effort to increase our knowledge base on the world drug problem, UNODC has been working towards the creation of an Illicit Drug Index. The Illicit Drug Index is meant to provide a single standard measure of the drug problem that would enable comparisons across regions and countries and over time. The basic concept and methodology of the Illicit Drug Index was highlighted in the 2005 edition of the *World Drug Report*. Work on the Illicit Drug Index continues with a view to providing Member States with a comparable measure of the extent and evolution of the drug problem and further developments will be presented in future editions of the *World Drug Report*.

Electronic copies of the report can be accessed via the UNODC website at www.unodc.org. Comments and feedback on the report can be sent to: worlddrugreport@unodc.org.

Explanatory notes

This report has been reproduced without formal editing.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Countries and areas are referred to by the names that were in official use at the time the relevant data were collected.

In various sections, this report refers to a number of regional designations. These are not official designations. They are defined as follows: West and Central Europe: EU 25 plus EFTA plus San Marino and Andorra; East Europe: European CIS countries; Southeast Europe: Turkey and the non-EU Balkan countries; North America: Canada, Mexico and United States of America.

The following abbreviations have been used in this report:

ARQ	Annual reports questionnaire
ATS	Amphetamine-type stimulants
CICAD	Inter-American Drug Abuse Control Commission
CIS	Commonwealth of Independent States
DEA	United States of America, Drug Enforcement Administration
DELTA	Database on Estimates and Long Term Trend Analysis
DUMA	Drug Use Monitoring in Australia
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ESPAD	European School Survey Project on Alcohol and other Drugs
F.O.	UNODC Field Office
Govt.	Government
ICMP	UNODC Global Illicit Crop Monitoring Programme
INCB	International Narcotics Control Board
INCSR	United States of America, International Narcotics Control Strategy Report
Interpol	International Criminal Police Organization
LSD	lysergic acid diethylamide
NAPOL	National Police
PCP	phencyclidine
THC	tetrahydrocannabinol
UNAIDS	Joint and Co-sponsored United Nations Programme on Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
UNODC	United Nations Office on Drugs and Crime
WCO	World Customs Organization
WHO	World Health Organization

Weights and measurements

u.	Unit
lt.	Litre
kg	Kilogram
ha	Hectare
mt	Metric ton
u.	Unit

Executive Summary

Chapter 1: Trends in World Drug Markets

Evolution of the world drug problem

The *World Drug Report* tries to provide a comprehensive and up-to-date picture of the world drug situation. This is essential to assess the performance of drug control interventions and to guide policy-making. While data in this report is, in many cases, provided for at least the last ten years, its analysis emphasizes the most recent and most topical developments. Monitoring current developments is essential, however, it is also important to take a longer-term view to assess the performance of the multilateral drug control system.

International drug control is one of the oldest forms of multilateralism, older than the United Nations and even predating its predecessor body, the League of Nations. While the use of psychoactive plants has been with us for a long time, it was at the beginning of the 20th century when a series of national or local drug problems turned into an international problem. The International Opium Commission was convened in Shanghai, China, in 1909 and spawned the first instrument of international law to deal with psychoactive substances: the Hague Opium Convention of 1912.

From these origins began a process that has evolved into the multilateral drug control system. The scope of control over drugs has broadened and deepened over the years, from opium to cocaine to cannabis to psychotropic substances, and from the regulation of production and trade of medical drugs to the goal of international cooperation against the multi-faceted problems associated with illicit drugs. The legal framework for this whole multilateral control system is now provided by three international drug conventions (1961, 1971 and 1988) which enjoy quasi-universal adherence.

Evidence of long-term containment

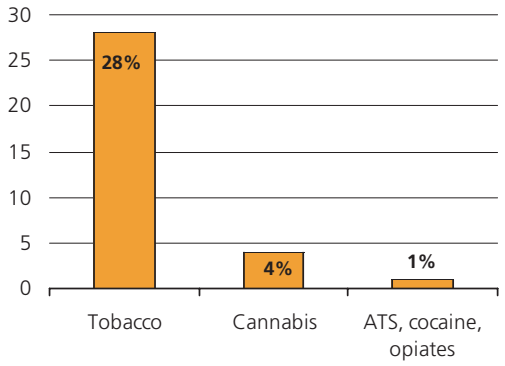
With regard to the performance of that multilateral system, there is evidence that, over the last hundred years, it has reduced and contained the drug problem at the global level. While tracking a trend over a century is difficult because there are few facts, some baselines can be found. The best is for the opium problem, because it was investigated at the Shanghai Commission in 1909.

Shortly before the Shanghai Commission was convened, world opium production was estimated to have been at least 30,000 metric tons. Nearly a hundred years later, world opium production is down to about 5,000 metric tons, which includes some 400 metric tons of licit medical opium and 4,620 metric tons of illicit opium. The world's population has grown from about 1.65 million in 1900 to 6.4 billion. Opium production is thus 80 percent less in a world that is more than three times larger.

In China, which had, at the time, a population of about 450 million, there were close to 25 million opium users. Today, the estimated number of opiate users in Asia is some 8.5 million. There are of course, many other drugs today. But the trend is still a powerful illustration of the containment of illicit drug production over a century.

The picture is more bleak for licit psychoactive substances. Tobacco, a particularly addictive substance, is a case in point. About 28 per cent of the world's adult population is estimated to use tobacco, which exceeds, by far, the number of people using illicit drugs (4 per cent for cannabis and 1 per cent for ATS, cocaine and opiates combined).

Use of illicit drugs compared to use of tobacco (in % of world population age 15-64)



Sources: Drug estimates: UNODC, study estimates based on Annual Reports Questionnaire Data and Government Reports; tobacco estimates: derived from WHO, World Health Statistics 2006.

The multilateral drug control system has, in fact, contained the problem to 5 per cent of the world population (age 15-64). This is an achievement that should not be underrated and provides a useful perspective when analysing more recent developments.

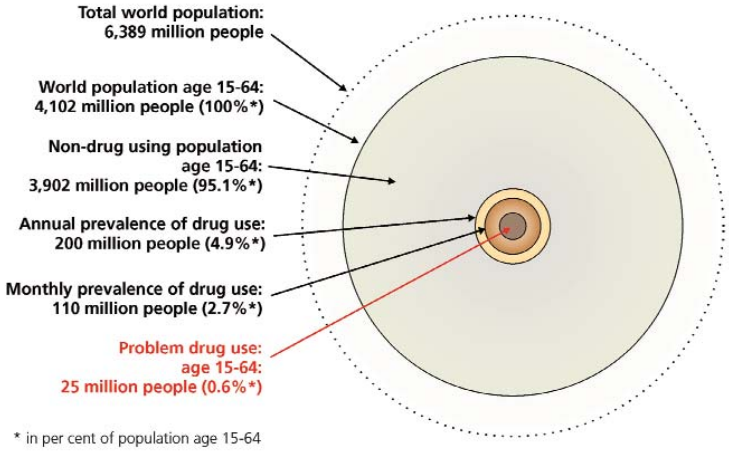
Of these 5 per cent of the population (age 15-64), who use illicit drugs at least once a year (annual prevalence), only about half of them (2.7 per cent of the population age 15-64) use drugs regularly, that is, at least once per month. The number of what are commonly understood to be drug addicts or problem drug users is some 25 million persons worldwide, equivalent to 0.6 per cent of the population age 15-64. This estimate does not seem to have changed much in recent years at the global level as increases in some countries were offset by declines in others.

Encouraging signs of mid-term containment

A review of the problem over the more recent past also brings to light some positive developments. Throughout the 1990s, the global area under coca cultivation was around 200,000 hectares. Since 2000, there has been a reduction by more than a quarter. Last year global opium poppy cultivation was also 36 per cent below the levels recorded in 1998 (237,819 hectares) and 46 per cent lower than in 1991 (281,560 hectares), despite the resurgence of opium poppy production in Afghanistan over the past years.

Even with drug abuse, where data is often not available or comparable, there have been some positive trends. At the global level, use of ATS, cocaine and opiates has remained largely stable for the past three years. So, while the number of drug users is still unacceptably high, there is hope that the use of at least some illicit drugs can be contained.

Illegal drug use at the global level (2004)



Current world situation: Further signs of stabilization, except for cannabis

The extent of **drug use** is one important indicator of the magnitude of the global drug problem. UNODC establishes annual prevalence estimates based on data provided by Governments in their annual reports questionnaire.

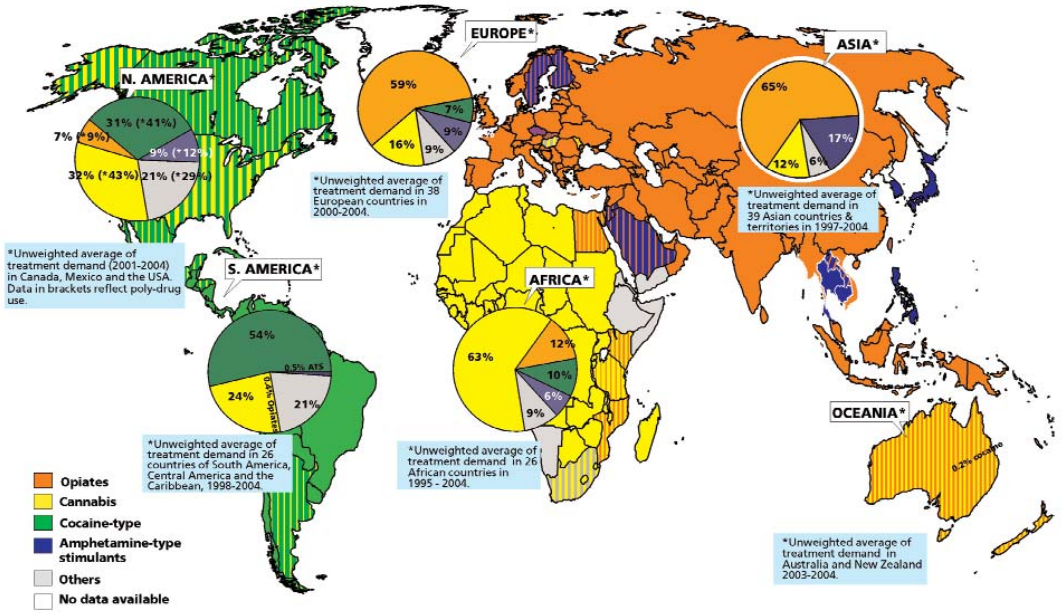
The total number of drug users in the world is now estimated at some 200 million people, equivalent to about 5 per cent of the global population age 15-64. Cannabis remains by far the most widely used drug (some 162 million people), followed by amphetamine-type stimulants (some 35 million people), which include amphetamines (used by 25 million people) and ecstasy (almost 10 million people). The number of opiate abusers is estimated at some 16 million people, of which 11 million are heroin abusers. Some 13 million people are cocaine users.

The paucity of the data on which the annual prevalence estimates are based does not allow for the identification of clear global trends in the short term. As an imperfect complement, UNODC relies on the perception of the trends in their countries by national experts. A global analysis of these perceptions suggest that the strongest increase over the last decade was for cannabis use and ATS, and at lower levels for opiates and cocaine. After some stabilization in 2003, ATS drug use was perceived as having increased again, reflecting the prevailing view in East and South-East Asia that methamphetamine use has started rising again.

Opiate abuse trends flattened in recent years. However, by 2004, opiate abuse perceptions again went upwards, as many countries around Afghanistan experienced a renewed supply-push following Afghanistan's good opium harvests of 2003 and 2004. In other parts of the world, including North America and Western Europe, abuse levels remained constant for opiates. After years of increases, cocaine use is perceived as declining slightly, notably in the Americas. In Europe, by contrast, cocaine use continues to expand.

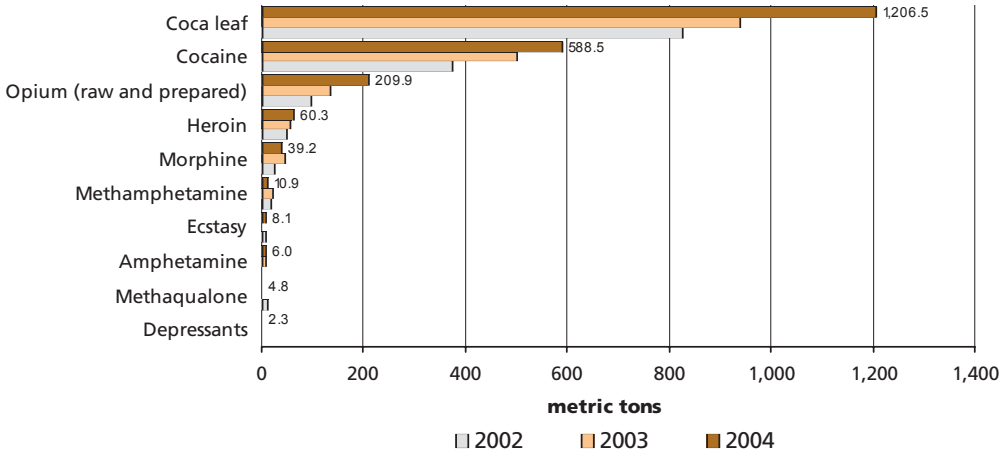
Treatment demand provides some insight into the world drug problem, in terms of the impact of drugs on health. In Africa, most treatment is required for cannabis use whereas for Asia and Europe treatment demand is highest for opiates. Treatment demand for cocaine use is highest in South America, followed by North America. For abuse of ATS, treatment demand is highest in Asia, followed by Oceania, North America, Europe and Africa. The level of treatment demand tends to mirror the abuse situation, with cannabis being the big exception. Only a relatively small proportion of the

Main problem drugs (as reflected in treatment demand) in 2004 (or latest year available)



Source: UNODC, Annual Reports Questionnaire Data/DELTA and National Government Reports.

Global drug seizures, excluding cannabis (in weight equivalents), 2002-2004



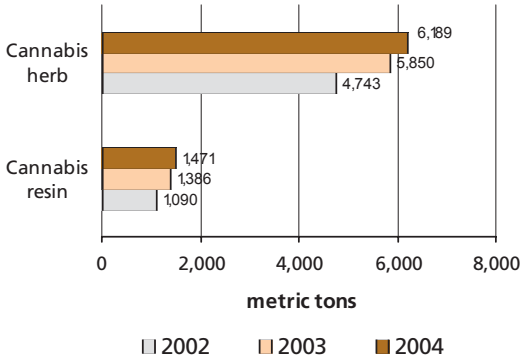
Source: UNODC, Annual Reports Questionnaire Data / DELTA.

millions of cannabis users require treatment services. It should be noted, however, that treatment demand for cannabis has continuously increased over the past years, particularly in Europe and North America. Treatment demand for heroin abuse has shown an upward trend in Africa, notably East Africa. Treatment demand for ATS has been rising in North America, Asia and Europe and treatment demand for cocaine has moved upwards in Europe.

Governments have collected information on **drug seizures** since the time of the League of Nations. If seizure data are collected by a large number of countries over a longer period of time, they are usually a good indicator of underlying changes in illicit drug trafficking patterns.

Existing data show a continuous increase in the level of world seizures, with increases for both cannabis herb and cannabis resin (+6 per cent), opiates (+ 9 per cent), and cocaine (+18 per cent) in 2004. Seizures of amphetamines declined by 25 per cent in 2004 whereas ecstasy seizures increased significantly, albeit from a much lower level. The reasons for the increases in the different drug groups are manifold but most increases can be explained by a combination of wider availability of the drug and strengthened law enforcement efforts. This is particularly true for cocaine seizures where efforts of law enforcement authorities on rapid intelligence sharing appear to have paid off. The decline of seizures of amphetamines should be seen in a larger perspective. For the past ten years, seizures in this drug category have increased on average by 12 per cent per year.

Global cannabis seizures (in weight equivalents), 2002-2004



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

Opium/heroin market

Several positive developments were observed: the total area under opium poppy cultivation declined in 2005, as did global opium production. Global seizures of opiates (heroin, morphine and opium) increased, particularly in South-East Europe, and global abuse of opiates appears to be stable.

Decline in global opium poppy cultivation

In 2005, the estimated area under illicit opium poppy cultivation in the world decreased by 22 per cent (from 195,940 hectares to 151,500 hectares) due to lower cultivation in the three main source countries of illicit opium in the world: Afghanistan, Myanmar and Lao People's Democratic Republic (Lao PDR). Global opium production was estimated at 4,620 metric tons of which 4,100 metric tons (89 per cent) were produced in Afghanistan.

Afghanistan: first fall in opium poppy cultivation since 2001

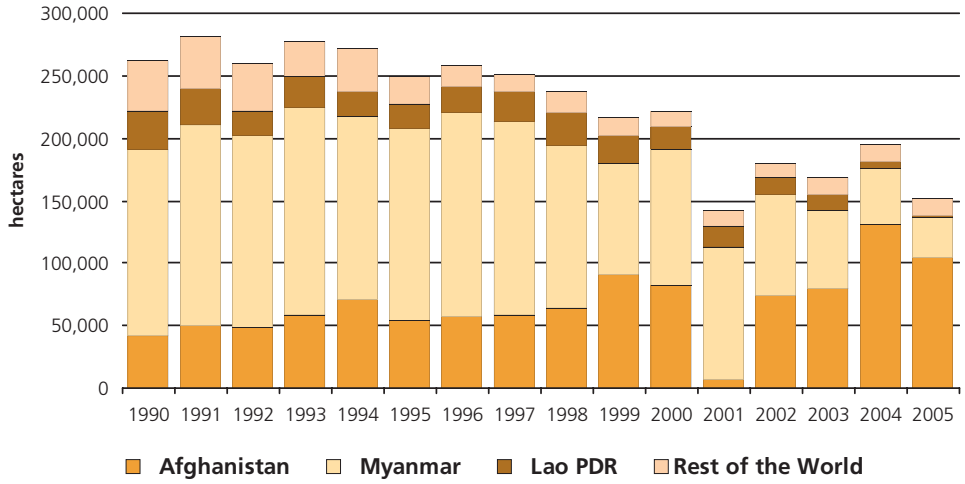
In Afghanistan, in 2005, opium poppy cultivation decreased for the first time since 2001. The area under opium poppy cultivation decreased by 21 per cent from about 131,000 hectares in 2004 to 104,000 hectares in 2005. The national trend, however, masked considerable provincial differences. While sharp declines could be seen in some provinces (e.g. Nangarhar, from 28,213 hectares to 1,093 hectares), cultivation increased in others (e.g. Kandahar, from 4,959 hectares to 12,989 hectares).

Early indications are, however, that planting of opium poppy increased during 2006, particularly in the southern provinces.

An overlooked success story: South–East Asia

Sustained progress has been made by the Governments of Myanmar and Lao PDR in addressing illicit opium poppy cultivation. In 2005, Myanmar achieved a further reduction of the total area under cultivation, by 26 per cent to 32,800 hectares. In Lao PDR, cultivation dropped by an impressive 72 per cent, to 1,800 hectares. With an estimated opium production of only 14 metric tons, the country is on the verge of becoming opium poppy free. Since 1998, the year of the General Assembly Special Session on the World Drug Problem, opium poppy cultivation in these two South-East Asian countries has been reduced by 78 per cent.

Global opium poppy cultivation, 1990-2005



Golden Triangle area under cultivation (in hectares)

	1998	2005
Myanmar	130,300	32,800
Lao PDR	26,837	1,800
Thailand	716	insignificant
Viet Nam	442	insignificant
Total	158,295	34,600

Sustaining these remarkable achievements may, however, largely depend on the availability of socio-economic alternatives for the farmers who have given up a traditional source of their livelihood. This makes the provision of development assistance to these communities both a humanitarian and a strategic necessity.

Significant reductions in Latin America

In the Americas, opium poppy continues to be cultivated for use in the illicit markets in North America. Estimates by the Government of Colombia put the area under opium poppy cultivation at about 2,000 hectares, a reduction of 50 per cent compared to the 4,000 hectares recorded in 2004. The Government of Mexico did not provide any cultivation data to UNODC at the time of producing the present report but the United States estimates that, in 2005, 3,300 hectares were devoted to opium poppy cultivation in Mexico, equivalent to a decline of 32 per cent since 2003. The situation as regards opium poppy cultivation in Peru is difficult to quantify as the UNODC supported national illicit crop monitoring system has not yet established a reliable methodology for the detection of opium poppy in that country. Colombia, Mexico and Peru all continue to eradicate opium poppy cultivation.

Global opium production declines by 5 per cent

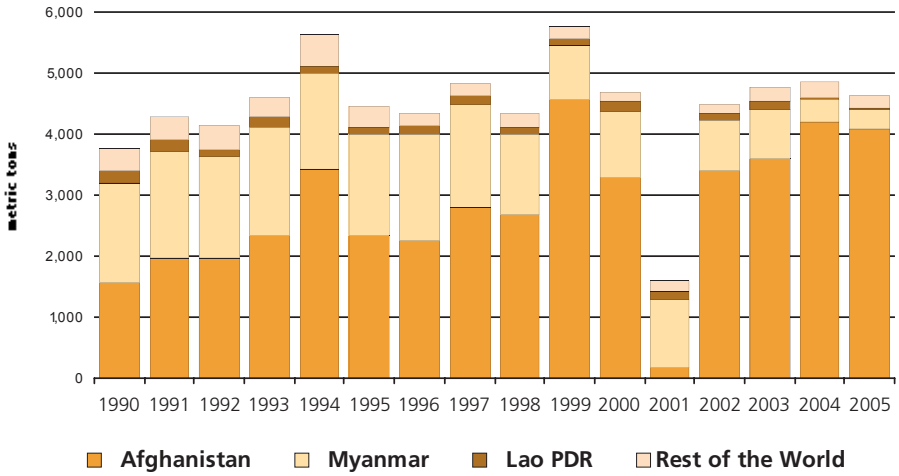
Despite the 18 per cent decrease in the area under opium poppy cultivation, global opium production decreased by only 5 per cent, to 4,620 metric tons in 2005. In Afghanistan, potential opium production was estimated at around 4,100 metric tons, representing a 2 per cent decrease compared to 2004. The clear discrepancy between the large reduction in cultivation and the relatively small reduction in production was primarily due to more favourable weather conditions during the 2005 growing season in Afghanistan. In 2005, Afghanistan was therefore the source of 89 per cent of global opium production, followed by Myanmar (7 per cent).

Opiates are trafficked along three main trafficking routes

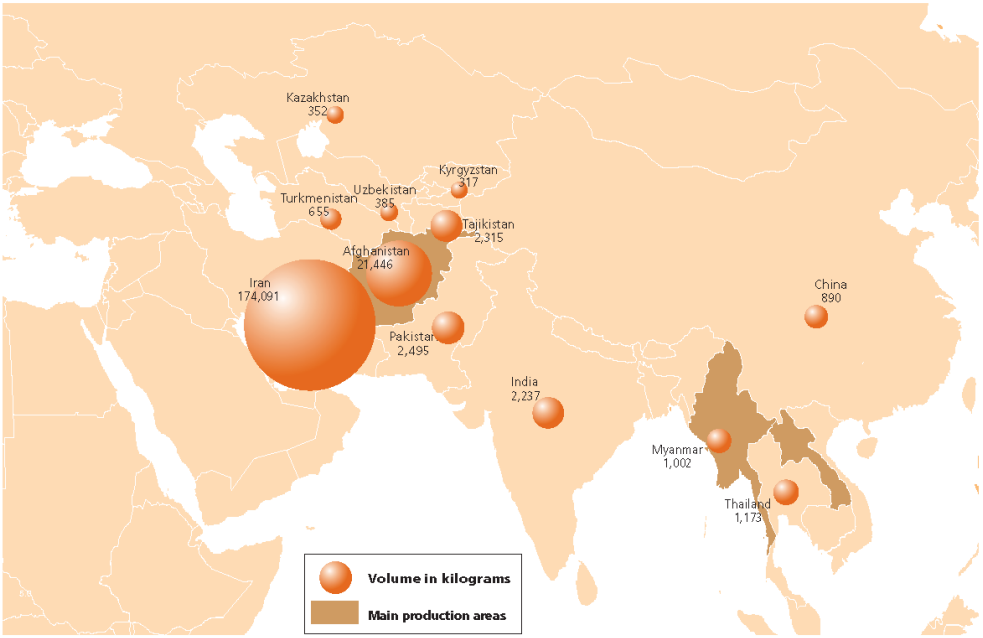
While it is extremely difficult to measure actual drug trafficking flows, seizures provide a useful indicator. Thus, three major trafficking routes for opiates (heroin, morphine and opium) can be identified:

- from Afghanistan to neighbouring countries, the Middle East and Europe;

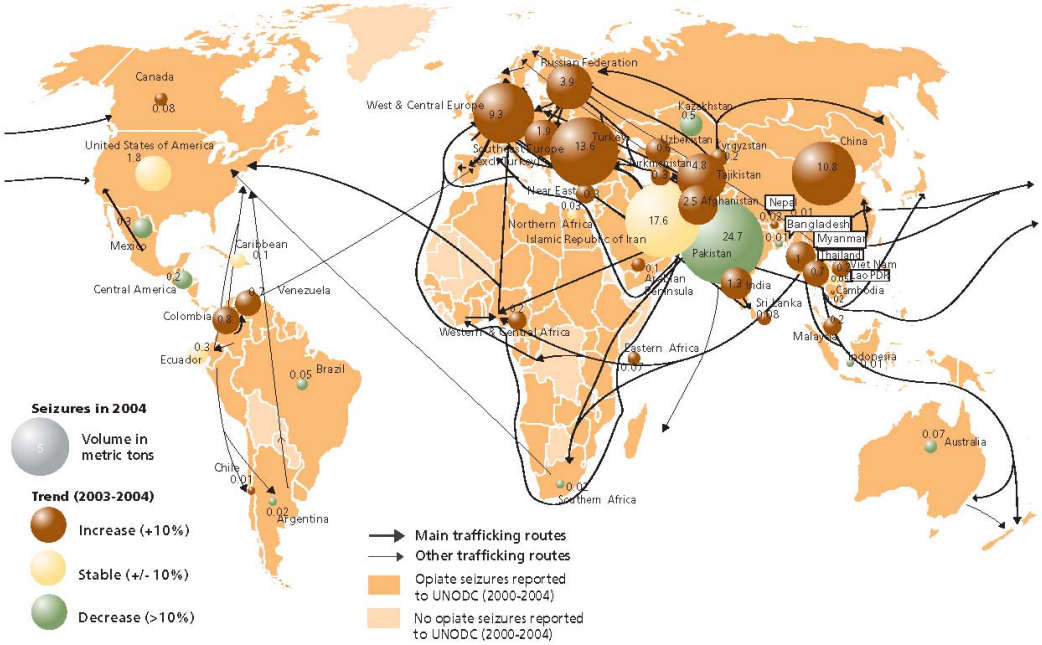
Estimated global opium production, 1990-2005



Seizures of opium in Asia in 2004 (only highest ranking countries represented)



Heroin and morphine seizures 2003-2004: extent and trends (only highest ranking countries represented)



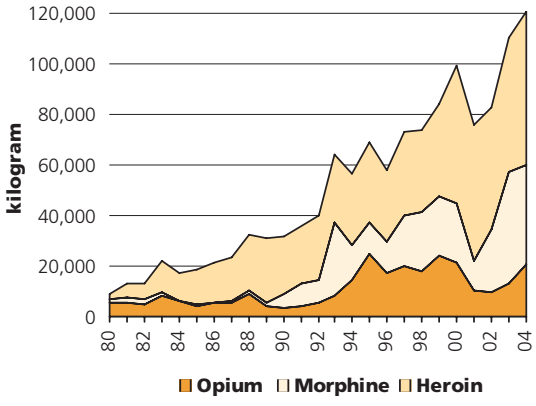
- from Myanmar/Lao PDR to neighbouring countries in South-East Asia, (notably China) and to Oceania (mainly Australia);
- from Latin America (Mexico, Colombia and Peru) to North America (notably USA)

The proportion of opiate seizures, expressed in heroin equivalents, along the Afghanistan–Europe trafficking route increased from 78 per cent to 85 per cent between 2002 and 2004, reflecting rising levels of opium production in Afghanistan and rising levels of opiate trafficking from that country. The volume of opiate seizures along the other two main routes showed a downward trend (from 7 per cent to 4 per cent in the Americas, and from 15 to 11 per cent for the South-East Asia/Oceania route).

Global seizures of opiates increase, by 9 percent, to 120 metric tons

Global seizures of opiates reached 120 metric tons in 2004 (+ 9 per cent compared to 2003). Increases were particularly strong in South-East Europe (+109 per cent) reflecting the resumption of large-scale trafficking along the Balkan route. Highest seizures were reported by Iran, followed by Pakistan and China. The largest heroin seizures were reported from China (10.8 metric tons). The estimated global interception rate for opiates was 24 per cent of global production, a clear increase from the 10 percent recorded 10 years earlier.

Global opiate seizures, expressed in heroin equivalents, by substance, 1980-2004



Source: UNODC, Annual Reports questionnaire Data/DELTA.

Changes in opium production centres affect trafficking patterns in Afghanistan

The shift in opium production centres in Afghanistan affected the way opium and heroin was trafficked to neighbouring countries in 2005. Decreasing opium production in north-eastern Afghanistan reduced the level of trafficking to countries in Central Asia. Declining opium production in eastern Afghanistan also reduced the amounts of opiates trafficked towards Pakistan. On the other hand, opiate trafficking towards the Islamic Republic of Iran continued to increase (close to 60 per cent, up from 40 per cent of the opiates leaving Afghanistan in 2004). Ongoing production increases of opium in southern Afghanistan in 2006 are likely to put an additional burden on to law enforcement authorities of Iran in their efforts to prevent the trafficking of Afghan opiates to their country.

Increases in opiate seizures in South-East Europe

Europe's opiate seizure rose by 49 per cent in 2004 and reached almost 29 metric tons (in heroin equivalents), the highest such figure ever recorded. The increase in European seizures was primarily due to the doubling of opiate seizures in South-East Europe where more than 15 metric tons were seized, exceeding the total seizures made in West & Central Europe and Eastern Europe.

Turkey reported, once again, most opiate seizures in Europe, a position the country has held without interruption since 1987. The second largest opiate seizures in Europe, for the second year in a row, were reported by the Russian Federation (4 metric tons or 14 per cent of European opiate seizures). The largest seizures among West European countries were made in the United Kingdom, Italy, Netherlands, Germany and France. The United Kingdom is Europe's main opiate market and a final destination country.

Opiate seizures rise by 60 per cent in Africa

Opiate seizures in Africa also showed a strong increase in 2004 (+60 per cent). The bulk of this increase is due to seizures made in West and Central Africa which more than doubled between 2003 and 2004. Heroin is trafficked through African countries for markets in Europe and, to a lesser extent, North America. Sources of the opiates are both countries in South-West Asia and South-East Asia. The overall amounts of opiates seized in Africa are, however, still very modest (0.3 per cent of global opiate seizures), but may not properly reflect the actual level of trafficking flows as many countries lack adequate law enforcement capabilities.

Global abuse of opiates appears to be stable

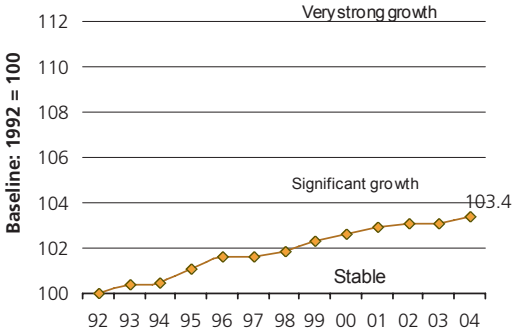
Almost 16 million people in the world, or 0.4 per cent of the world's population aged between 15 and 64 years, are abusers of opiates. The prevalence estimate is similar compared to the one published in the 2005 *World Drug Report*.

More than half of the world's opiate abusing population lives in Asia and the highest levels of opiate abuse are along the main drug trafficking routes originating from Afghanistan.

At the global level, of the world's 16 million opiates abusers, some 70 per cent (11 million) are abusers of heroin. However, the proportions vary by region. In Africa, all opiates abusers reportedly abuse heroin. In Asia, around 64 per cent of opiate users abuse heroin as use of opium is still widespread.

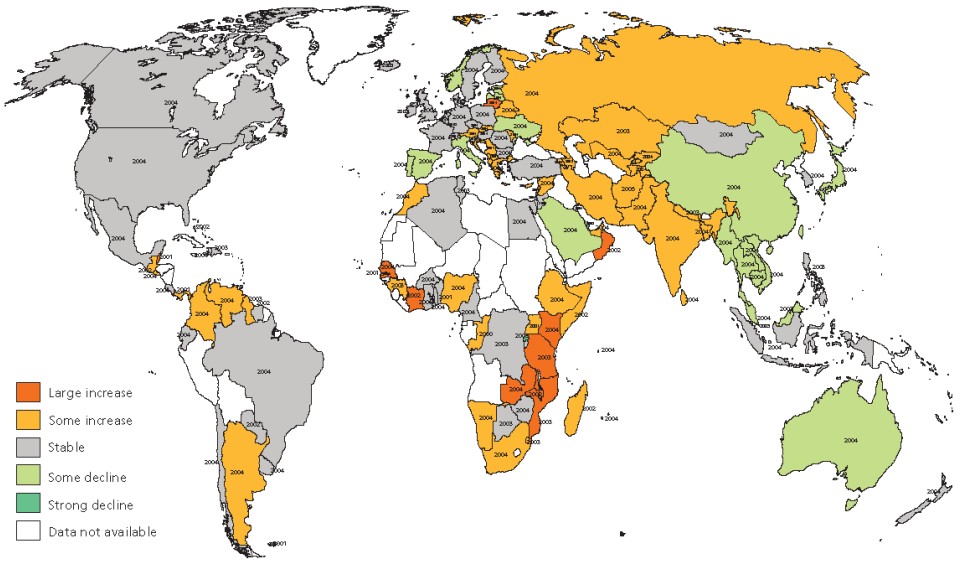
Along with increasing opiate production in Afghanistan, some neighbouring countries of Afghanistan and opiate transit countries in Eastern Africa as well as some of the countries along the Balkan route in South-East Europe reported rising levels of opiate abuse in 2004. These increases were, however, again largely offset by falling levels of opiate abuse reported from countries in East and South-East Asia and Oceania, reflecting ongoing declines of opiate production in the Golden Triangle (notably in Myanmar and Lao PDR). Trends in North America and in most of Western Europe were largely stable. The net result was a small increase in expert perception of the global use of drugs.

Twelve-year drug use trend, as perceived by experts: opiates



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, HONLEA reports and local studies.

Changes in abuse of heroin and other opiates, 2004 (or latest year available)



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, HONLEA reports and local studies.

Coca/Cocaine market

Some encouraging trends were noted on the coca/cocaine market. The area under coca cultivation remained essentially stable and well below levels recorded in 2000. Global production of cocaine stayed largely at the same level and seizures of cocaine rose to new highs. Global cocaine use declined slightly.

Global cultivation of coca remains stable in 2005

Preliminary figures suggest that the total area under coca cultivation remained stable in 2005. Thus the area under coca cultivation (159,600 hectares) was 28 per cent below the peak levels recorded in 2000 (221,300 hectares). Most coca continues to be cultivated in Colombia (54 per cent), followed by Peru (30 per cent) and Bolivia (16 per cent).

After four consecutive years of decline, over which coca cultivation decreased in Colombia, the total area under coca cultivation in that country increased by 8 percent to 86,000 hectares. The increase came about despite sustained eradication efforts of the Government of Colombia. Some coca is cultivated in national parks which causes environmental damage, primarily deforestation. Nonetheless, the area under coca cultivation in Colombia is still 47 per cent less than in 2000.

Coca cultivation declined in Bolivia (-8 per cent) and in Peru (-4 per cent) in 2005. However, the areas under coca cultivation are 74 per cent higher in Bolivia and 11 per cent in Peru as compared to the levels in 2000.

Estimated production of cocaine stays largely at the same level

The potential production of cocaine reached 910 metric tons in 2005. Potential cocaine production in Peru amounted to 180 metric tons in 2005 and to 90 metric tons in Bolivia. The overall level of cocaine production remained essentially stable in 2005 and is practically unchanged from the levels of a decade ago.

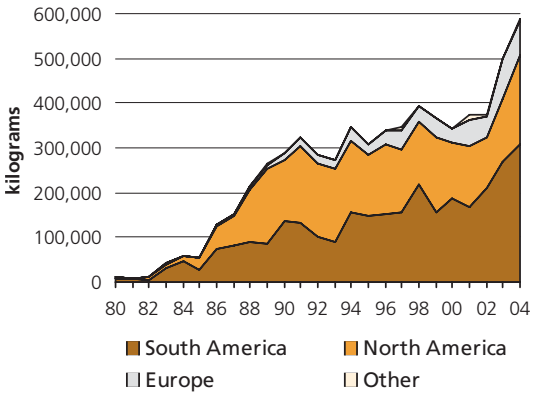
Global cocaine seizures rose to another record high in 2004

There are two main trafficking routes for cocaine:

- from the Andean region, notably Colombia, to the United States (often via Mexico), and
- from the Andean region to Europe (via the Caribbean and, increasingly, via Africa).

Cocaine seizures increased to 588 metric tons in 2004, an 18 per cent increase and the highest figure ever recorded. This followed an increase in global cocaine seizures of 34 per cent in 2003. The increase has been – to a large extent - the result of better cooperation among law enforcement services and improved sharing of intelligence information. Indications are that this trend continued in 2005 and will probably continue in 2006.

Global cocaine seizures, regional breakdown, 1980-2004

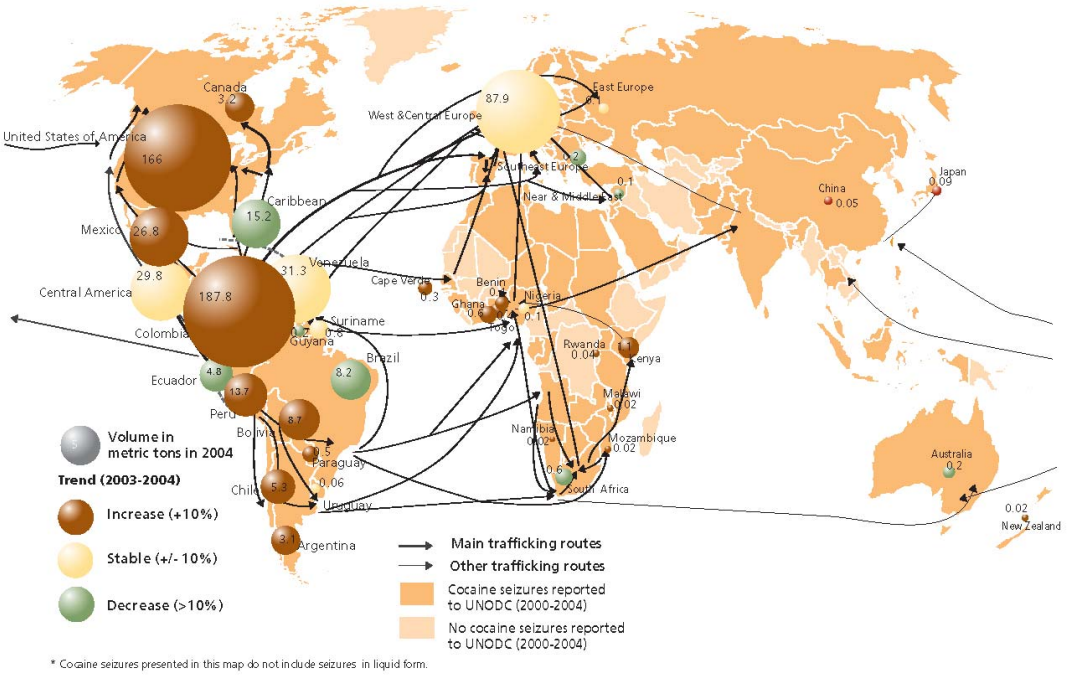


Source: UNODC, Annual Reports questionnaire Data/DELTA.

Coca cultivation in the Andean region, 1998-2005 (hectares)

	1998	1999	2000	2001	2002	2003	2004	2005
Bolivia	38,000	21,800	14,600	19,900	21,600	23,600	27,700	25,400
Peru	51,000	38,700	43,400	46,200	46,700	44,200	50,300	48,200
Colombia	101,800	160,100	163,300	144,800	102,000	86,000	80,000	86,000
Total	190,800	220,600	221,300	210,900	170,300	153,800	158,000	159,600

Cocaine seizures in 2004 (only highest ranking countries represented)



* Cocaine seizures presented in this map do not include seizures in liquid form.

Colombia seizes the most cocaine

For the third year in a row, Colombia seized most cocaine in the world (almost 188 metric tons), 32 per cent of the world total and an increase of 29 per cent compared to 2003. The second largest seizures were reported from the United States (166 metric tons, 28 per cent of the world total). In Ecuador, there has been a 9-fold increase in seizures (5 metric tons in 2004, 44 metric tons in 2005).

European cocaine seizures were close to 80 metric tons in 2004 and about 100 metric tons in 2005. Over the 1994-2004 period they increased by, on average, 10 per cent per year. Spain remains Europe's main entry point for cocaine. Large increases in cocaine seizures have also been reported from Portugal which has become another major gateway for cocaine destined for European markets. Portugal reported the third largest cocaine seizures among European countries in 2004, after Spain and the Netherlands.

One of the main cocaine trafficking routes to Europe continues to go via the Caribbean region. The Netherlands Antilles are of special importance in this regard. The Dutch authorities made more than 40 per cent of their total seizures in the waters around the Netherlands Antilles in 2004. There are also important cocaine shipments to metropolitan France transiting the Caribbean region, including the French overseas departments in the Caribbean.

Cocaine seizures in West and Central Africa show six-fold increase

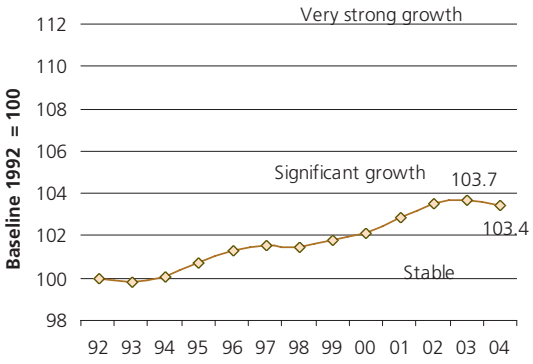
The rising importance of Africa, and notably of West Africa, as a transit point for cocaine shipments destined for European markets is becoming more evident. Seizures made in Africa increased more than three-fold in 2004 with seizures in West and Central Africa increasing more than six-fold. Most of this cocaine is destined for Spain and Portugal for onward shipment to other European countries. Largest seizures over the 2000-2004 period in Africa were made in Cape Verde, followed by South Africa, Kenya, Ghana and Nigeria. Despite this increase, African seizures still account for less than 1 per cent of global cocaine seizures but there are indications that only a very small proportion of cocaine transiting the African continent is actually seized. If it is sustained, this shift in trafficking patterns is likely to have an impact on abuse in Africa.

Overall level of cocaine use declines slightly

Cocaine use is estimated to affect 13.4 million people or 0.3 percent of the population age 15-64. Drug use perception trends show - for the first time in years- a moderate decline in 2004. Most cocaine continues to be used in the Americas, particularly North America, which accounts, with 6.5 million users, for almost half the global cocaine market. In the United States, recently released prevalence studies for high school students showed that, for both cocaine and crack cocaine, annual prevalence declined in 2005. Cocaine prevalence rates are some 20 per cent lower than in 1998. Declines in student surveys have been also reported from Canada and in studies conducted in a number of South American countries.

The opposite trend is observed in Europe, where cocaine use is still rising. The 3.5 million cocaine users in Europe account for 26 per cent of global cocaine use. Almost 25 per cent of the world's cocaine users are in West and Central Europe. Cocaine use in West and Central Europe (1.1 per cent of the population age 15-64) is still lower than in North America (2.3 per cent) but the trend in Europe is pointing upwards. Annual prevalence rates of more than 2 per cent have been reported from Spain and the United Kingdom.

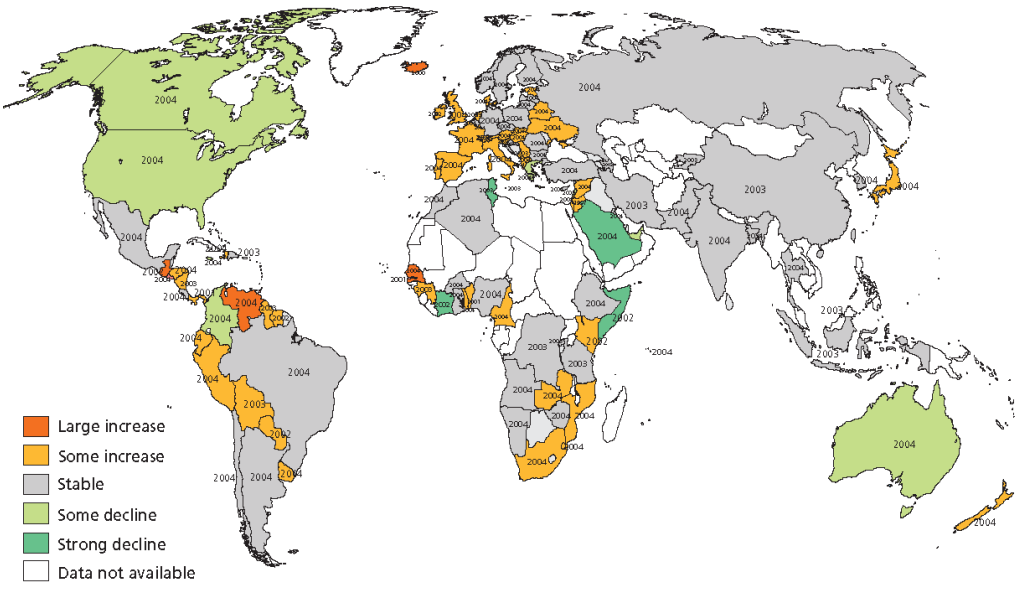
Twelve-year drug use trend, as perceived by experts: cocaine



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

In Oceania, the level of cocaine use is 0.9 per cent of the population age 15-64 and was perceived as falling. Cocaine use in Africa showed an upward trend in 2004, partly reflecting the increased use of Africa as a transhipment location for trafficking of cocaine to Europe. Cocaine use in Asia is still very limited.

Changes in abuse of cocaine, 2004 (or latest year available)



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Amphetamine-Type Stimulants market

The group of amphetamine-type stimulants (ATS) encompasses amphetamines (amphetamine, methamphetamine), ecstasy (MDMA and related substances) and other synthetic stimulants (methcathinone, phentermine, fenetylline etc.).

Signs of stabilization

After years of massive increases in the 1990s, the markets for amphetamine type stimulants seem to be stabilizing, reflecting improved international law enforcement cooperation and improvements in precursor control. The quantities of precursors and the number of illicit laboratories seized increased, as enforcement efforts intensified, but end-product seizures declined and the number of ATS users remained roughly stable.

UNDOC's global production estimate for ATS is at 480 metric tons, slightly higher than a year earlier, but still lower than the estimate for 2000. The broad error margins for the 2004 estimate, however, do not allow for a statistically valid statement whether production has increased. Methamphetamine manufacture and trafficking has spread beyond the traditional markets of Asia and North America (e.g. to South Africa), though in Europe it is still limited.

An even stronger geographical spread has been observed with regard to ecstasy production and trafficking. While there seem to have been some declines in the 'traditional' manufacturing locations of Western Europe (notably the Netherlands), ecstasy production is spreading to other parts of the world, including North America, Oceania and South-East Asia. Amphetamine production continues to be concentrated in Europe, but some shifts from the traditional centre (Netherlands) towards the new EU member states and the EU candidate countries have been noticed.

Seizures of amphetamines fall sharply

In 2004, seizures of amphetamines declined to 21 metric tons (-26 per cent). Since 2000, they have declined by 53 per cent, mainly reflecting lower seizures in East & South-East Asia. The highest seizures of amphetamines were reported from the United States, followed by China, Belgium, Thailand and the United Kingdom.

Ecstasy seizures skyrocket

Global seizures of ecstasy passed the 8 metric ton mark in 2004, up from less than 5 metric tons in 2003. Most ecstasy continues to be manufactured in Europe which also accounts for the majority of seizures made of that substance (53 per cent). More than 20 per cent of all ecstasy seizures are made in North America, reflecting decisive action by enforcement authorities to counteract illicit trafficking. The highest seizures of ecstasy were reported from Canada, Belgium, Australia, Netherlands and the United Kingdom.

Use of methamphetamine increasing again in parts of Asia and southern Africa

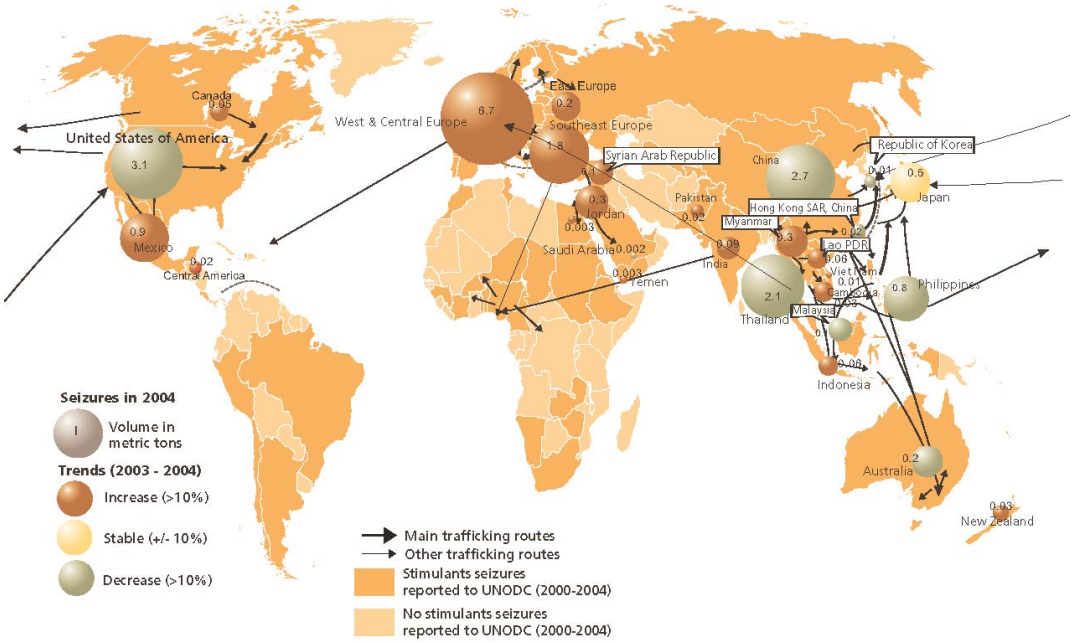
Some 25 million people used amphetamines in 2004, while some 10 million people used ecstasy. More than 60 per cent of the world's amphetamines users live in Asia while more than 50 per cent of the world's ecstasy users live in Western Europe and North America. Annual prevalence of amphetamines use is highest in Oceania, followed by North America and East and South-East Asia. In Europe, which is home to an estimated 2.7 million users of amphetamines, amphetamine use is far more widespread than the use of methamphetamine which is limited to the Czech Republic and some Baltic States.

Following some decline in 2003, use of methamphetamine was perceived to increase again in several parts of Asia. Exceptions were Japan and Thailand which reported a falling methamphetamine trend. Declining trends in the Asia/Pacific region were also observed in Australia. Strong increases in methamphetamine use were reported from South Africa, reflecting the emergence of local production.

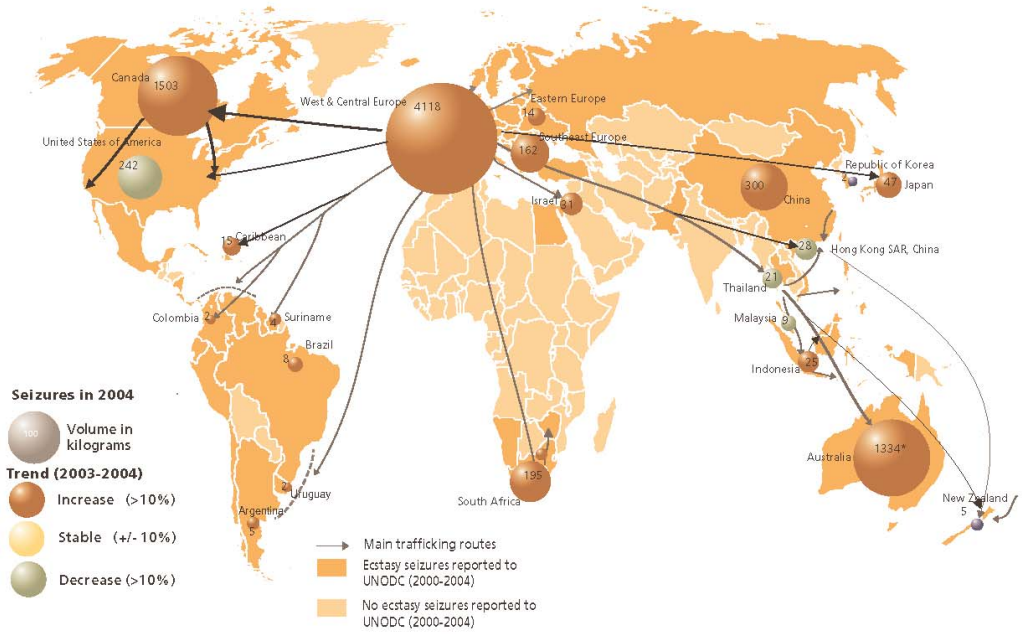
Mixed signals from North America and Europe

Trends for North America are stable to increasing. Methamphetamine use data for Mexico show an upward trend. In the United States, household survey data showed a stable level of methamphetamine use between 2003 and 2004 and surveys on adolescent use of methamphetamine have shown declining rates. However, treatment data continue to move clearly upwards, growing more strongly for methamphetamine than for any other substance.

Seizures of amphetamines (excluding 'ecstasy') in 2004 (only highest ranking countries represented)



Seizures of ecstasy in 2004 (only highest ranking countries represented)



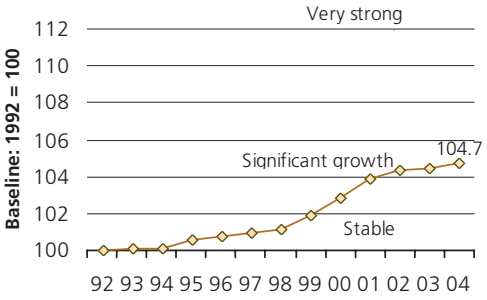
The European amphetamine market also provides a mixed picture. Amphetamine use was reported to have been stable in the United Kingdom, France and most Nordic countries and declining in Spain. Rising levels of use were reported from Germany, Italy and most central and East European countries.

The net result of all these trends was a small increase in the global drug use trend, as perceived by experts in 2004.

Global level of ecstasy use shows signs of stabilization following years of strong growth

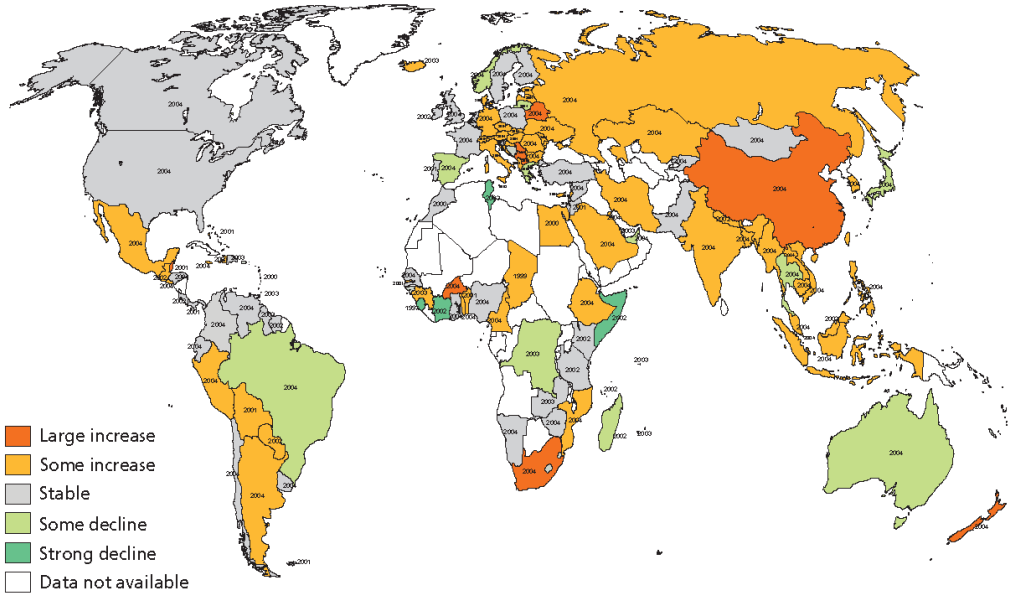
Use of ecstasy shows divergent trends. Massive declines in ecstasy use have been reported from countries in North America over the last few years, notably the United States, as reflected in student surveys. These surveys also show that availability has declined and that the perceived health risks have increased. The situation is different in Europe. Following years of increase, resulting in ever higher ecstasy prevalence data, exceeding those of amphetamine in a number of countries, ecstasy use has started to stabilize in several West European countries. In several South-East European countries, however, ecstasy use continues expanding. Increases have been also reported from countries in East & South-East Asia and Oceania.

Twelve-year drug use trend, as perceived by experts: amphetamine-type stimulants



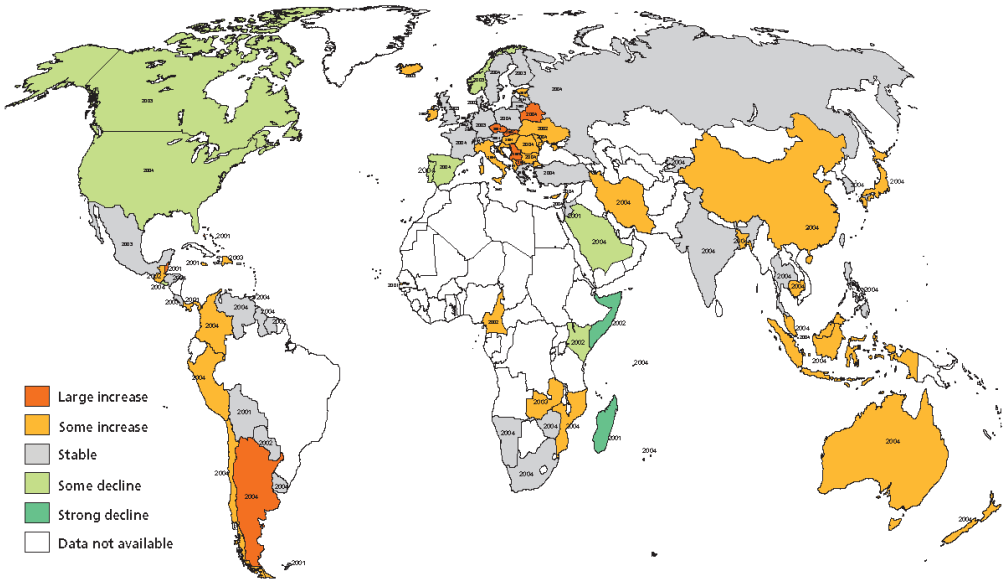
Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Changes in the use of ATS (methamphetamine and amphetamine), 2004 (or latest year available)



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Changes in the use of Ecstasy (MDMA, MDA, MDEA), 2004 (or latest year available)



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Cannabis market

Two types of cannabis dominate world cannabis markets

Two types of cannabis are produced in the world drug market. Production of cannabis herb (*marijuana*) is widely dispersed. Cannabis resin (*hashish*) is produced in about 40 countries in the world, with main sources being Morocco, Afghanistan and Pakistan.

Sharp drop in cannabis production in Morocco

Cannabis resin from Morocco primarily supplies Europe, the world's largest market for that substance. In cooperation with UNODC, the Government of Morocco carries out cannabis cultivation surveys. The area under cannabis cultivation dropped sharply in 2005, from 120,500 hectares in 2004 to an area of 72,500 hectares in 2005. The reduced availability of cannabis resin will affect the cannabis resin market in Europe. Cannabis users in that region may increasingly turn to herbal cannabis which has become more widely available in that region over the years. Cannabis resin production in Morocco declined from 3,070 metric tons in 2003 to 2,760 metric tons in 2004 and 1,070 metric tons in 2005, which is equivalent to a decline of 61 per cent in 2005.

Cannabis resin is also produced in Afghanistan, where the cultivated area could be 30,000 hectares, and Pakistan.

Increase in cannabis seizures

Cannabis herb and resin remain the most widely trafficked drugs worldwide, accounting for the majority of all seizures. For the first time, cannabis herb seizures surpassed 6,000 metric tons (+6 per cent) in 2004. Most cannabis herb seizures were reported from Mexico, followed by the United States, South Africa, Nigeria and Morocco. In 2004, seizures of cannabis resin also

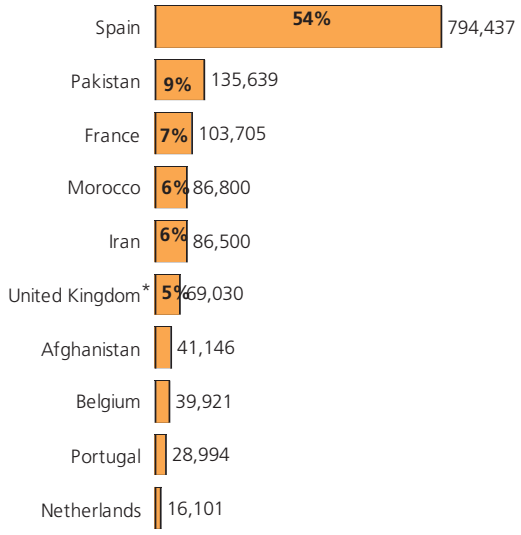
increased by 6 per cent to 1,470 metric tons. Most seizures of cannabis resin were made by Spain, followed by Pakistan, France, Morocco and Iran.

Cannabis remains the most widely used drug – and consumption continues to increase at the global level

Cannabis remains by far the most commonly used drug in the world. An estimated 162 million people used cannabis in 2004, equivalent to some 4 per cent of the global population age 15-64. In relative terms, cannabis use is most prevalent in Oceania, followed by North America and Africa. While Asia has the lowest prevalence expressed as part of the population, in absolute terms it is the region that is home to some 52 million cannabis users, more than a third of the estimated total. The next largest markets, in absolute terms, are Africa and North America.

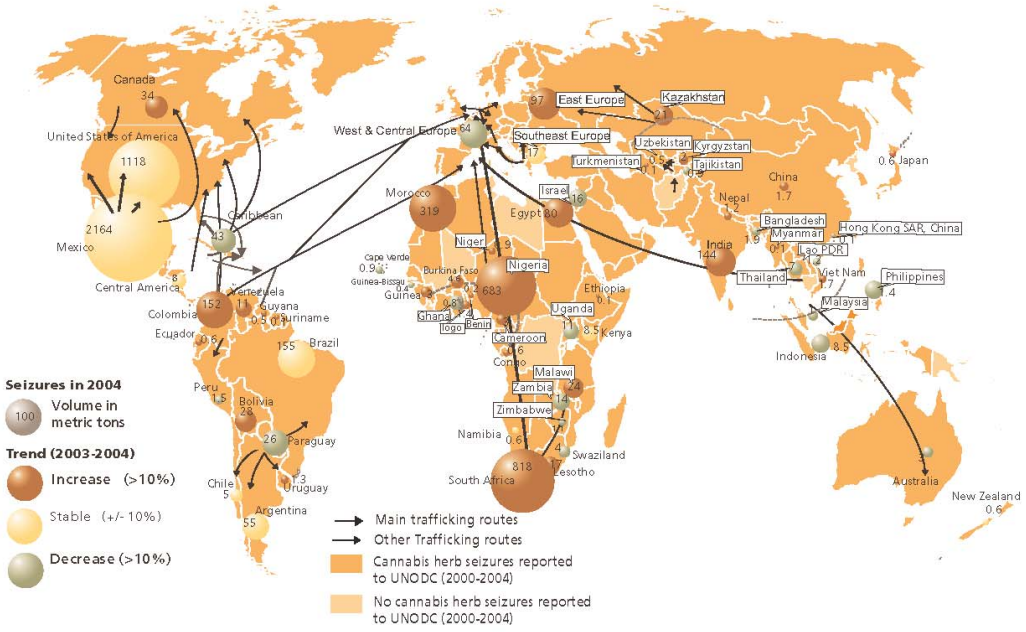
Trend data from the Americas show mixed results and are best described as stable to slightly declining, though in some countries cannabis use is also increasing. In the United States, the annual prevalence of cannabis use among the general population remained essentially stable in 2004. Cannabis use among secondary school students in the United States, however, continued to decline. Between 1997 and 2005 cannabis use among

Seizures of cannabis resin in % of world total and kg-highest ranking countries – 2004

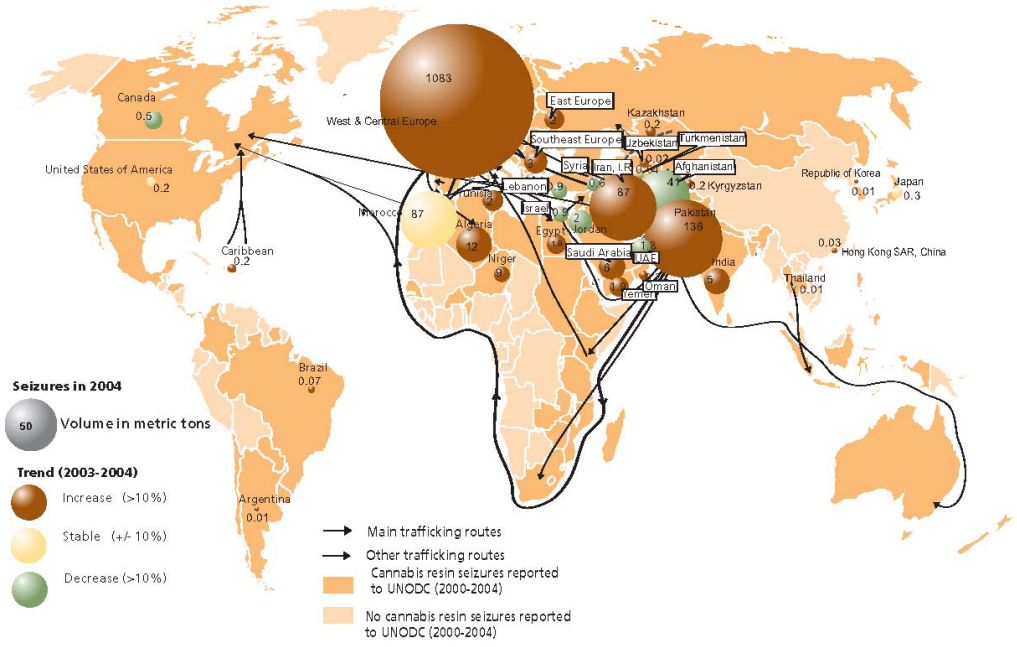


* data refer to 2003

Cannabis herb seizures 2003-2004: extent and trends (countries reporting seizures of more than 10kg.)



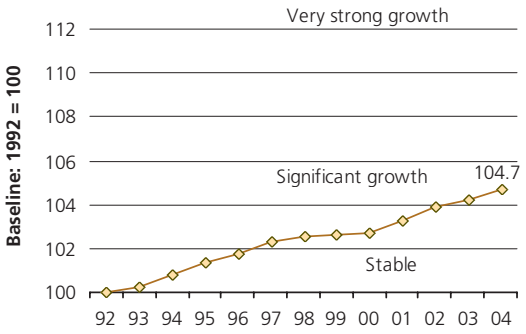
Cannabis resin seizures 2003-2004: extent and trends (countries reporting seizures of more than 10kg.)



high school students fell by some 20 percent. Declining use rates of cannabis were reported from Oceania.

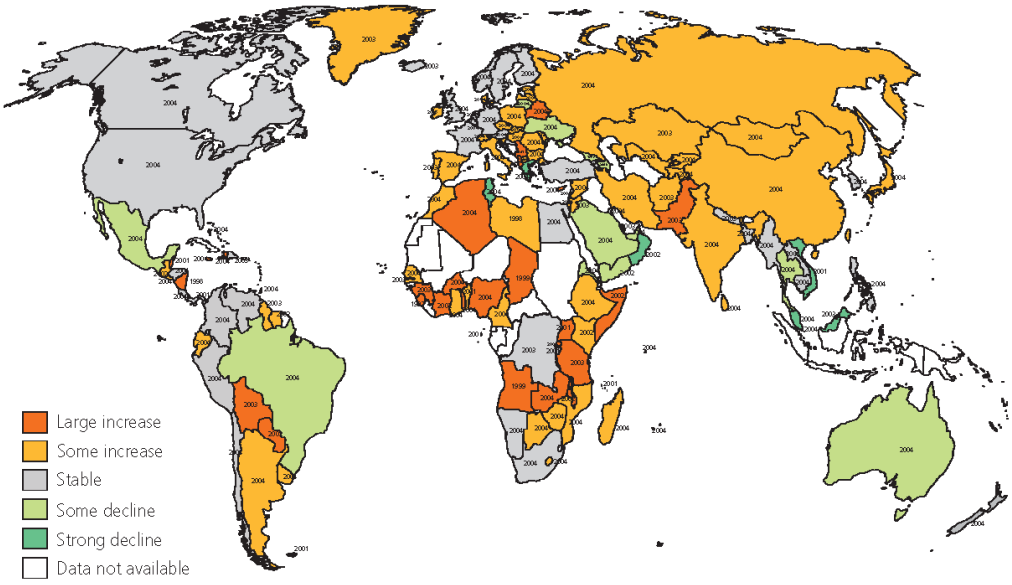
All these declines were, however, not sufficient to offset the increases reported from Africa, Asia and some countries in Europe. Perceptions by experts continued to point upwards, suggesting that the expansion of global cannabis use continued in 2004. Since the late 1990s, cannabis use increased by more than 10 per cent at the global level, as shown by the UNODC annual prevalence estimates. All available indicators suggest that the expansion of cannabis use over the last decade was stronger than increases for opiates or cocaine, similar to the one observed for the amphetamine-type stimulants. While ATS use however, has declined, cannabis use is still increasing.

Twelve-year drug use trend, as perceived by experts: cannabis



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Changes in the use of cannabis, 2004 (or latest year available)



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information

CHAPTER 2: CANNABIS – WHY WE SHOULD CARE

Though an estimated 162 million people use cannabis annually and it is produced in some 176 countries around the world, many basic facts about the supply and demand for this drug remain obscure. As the risks posed by cannabis consumption become clearer, our ignorance of this health issue begins to look particularly alarming. Of particular concern is the recent growth in potency and market share of re-engineered forms of the drug in the developed world. Coming to terms with cannabis will require a greater understanding of the dynamics of the market.

The world's biggest drug market is growing and uncharted

All available indicators suggest that global cannabis production, after having fallen in the late 1980s (mainly due to large-scale eradications in Latin America), rose again in the 1990s and continues rising in the new millennium. The volumes of cannabis seized internationally have been increasing since the early 1990s, and surveys show that global demand has also increased.

It is often assumed that since cannabis has been studied for decades, the nature of the drug must be well understood. But it is exceedingly difficult to document where some 4 per cent of the world's adult population are securing their supplies. Cannabis can be grown in virtually any country, and is increasingly grown indoors in the developed nations. Unlike other illicit drugs, users can, and do, cultivate their own supply, and so production is diffuse. Very few Governments can give an accurate estimate of the area of cultivation in their own countries, and the amount of drug product these fields would yield is subject to a range of variables, including the type of cannabis desired and the number of crops possible in the year.

The circumstances around cannabis consumption are no better understood. In most markets, cannabis is

cheap. Consequently, the precise amounts bought and consumed remain vague to all parties concerned. Surveys indicate that most users get their drug for free or buy it through social networks. Casual users generally consume cannabis in groups, and only a small amount of the drug is necessary to produce the desired effect. The standard consumption unit (a joint) is larger than the standard dose unit (a few inhalations) for most users. In the end, most users would find it difficult to say how much cannabis they smoke in any given consumption session.

Cannabis is everywhere

There is no region in the world where cannabis is not the dominant illicit drug, and few regions where cannabis use is not growing. It is everywhere, and spreading. While not every cannabis market is transnational (in the sense that production occurs in a different country than consumption), the problem is truly international.

North America is the largest cannabis consuming region in economic terms. Mexico alone is responsible for some 35 per cent of global herbal cannabis seizures, and conducts an ongoing intensive eradication campaign. Despite eradicating upwards of 80 per cent of the cannabis cultivated in the country, it is still able to supply a large share of the massive United States market with the residual 20 per cent. High-potency indoor cannabis has come to dominate the Canadian market, another source of significant imports to the US.

Africa comes second in the world in terms of herbal cannabis seizures, remarkable given limited law enforcement capacity. Africa is home to the world's leading producer of cannabis resin – Morocco, the site of the largest known cannabis cultivation area. Southern, Western, and Eastern Africa all contain large cannabis producing countries, but there are few specifics about the scale of cultivation.

Central and South America pose something of a puzzle. Large seizures are regularly made in several countries, but surveys indicate small user populations and, with the exception of Colombia, no country is known to be a major cannabis exporter beyond the region. Paraguay is said to be the major source of the cannabis consumed in the Southern Cone and Brazil, and, according to Government estimates, may be the single largest producer of herbal cannabis in the world.

Oceania has the world's highest annual use levels, including those of Papua New Guinea, where an estimated 30 per cent of the adult population consumes the drug annually. Most countries appear to be self-sufficient in their cannabis supply. For example, Australia used to import cannabis, but growing law enforcement and growing domestic indoor production have greatly reduced the flows into the country.

Much of **Europe** users prefers cannabis resin to herbal cannabis, but this appears to be changing in many important markets. The Netherlands has been at the vanguard of the indoor cannabis revolution, and is currently named as an important source for at least 20 other countries. In Eastern Europe, Albania plays a similar role, said to be supplying another dozen countries with both herbal cannabis and resin. Most of the cannabis resin in Europe, however, continues to be trafficked from Morocco.

While use levels are low in **Asia**, the size of the population means that the continent is home to the largest group of cannabis users, an estimated third of the global total. Central Asia is said to be the original birthplace of cannabis and is home to the world's largest feral cannabis fields, which could easily supply world demand if they were actively cultivated. Afghanistan is the world's second largest producer of resin from cannabis, grown alongside opium poppy fields. Lebanon was once the world's leading resin supplier, and might be still if it were not for continual eradication efforts. South Asia is the home of hand-rubbed cannabis resin, and recent research indicates 2.3 million Indians are dependent on cannabis.

A global market that defies efforts to size it up

Given this wide geographic spread, the variety of ways that cannabis is cultivated and the general paucity of data, it is difficult to estimate the size of the global market. Looking at the available information from the top six producer countries, which together are responsible for three quarters of global seizures, a rough estimate of 231,000 hectares can be derived, providing some 30,000 metric tons of herbal cannabis and 7,000 metric tons of resin. Of this, less than a fifth (17 per cent) is seized.

Looking at demand side estimates, it appears that up to 95 per cent of global cannabis is consumed by the 14 per cent of the annual cannabis-using population who use the drug every day. Of this, more than two-thirds

(69 per cent) is consumed by the 4 per cent who are chronically intoxicated. As is often the case, demand-side estimates are less than those found on the supply side – about 19,000 metric tons.

Reconciling these estimates is a challenge, and underscores how little is known about the global cannabis markets. With the exception of Morocco, no country in the world publishes scientific estimates of the scale and nature of cannabis cultivation within its borders. Developed countries cannot say with any precision how much of the cannabis consumed by their populations is imported and how much is produced domestically, in high-tech, indoor operations aimed at producing a high-potency drug. This information may be lacking due to a perception that cannabis consumption is not a very important issue. Given the scale of consumption and an emerging understanding of the risks involved, this attitude may be misplaced.

The emergence of 'new cannabis' and the reassessment of health risks

There are two sets of developments that should cause policymakers to re-think their positions on cannabis. One is a doubling of potency in sinsemilla cannabis (consisting of the unfertilised buds of the female plant) and a growing market share for this drug. The second is recent research indicating that the health risks associated with cannabis consumption may have been underestimated in the past. The two trends may be related: as high-potency cannabis grows in popularity, the risks of consumption may have been thrown into high relief.

The re-engineering of cannabis

Since the 1970s, cannabis breeders in North America and Europe have been working to create more potent cannabis, and the market for high-potency, indoor-produced sinsemilla appears to be growing in many key consumption countries. Sinsemilla potency has increased dramatically in the last decade in the United States, Canada, and Netherlands – the three countries at the vanguard of cannabis breeding and production technology – and there are indications that its market share is growing in many others.

Impact on public health: Three reasons to worry

While more research is required to determine the impact of this 'new' cannabis, there has been an increase of **acute health episodes**, with the number of people complaining of 'unexpected effects' of consuming cannabis in emergency rooms increasing in the United States. Similarly, in parallel, there has been a **growth of rehabilitation demand** by those seeking help with cannabis problems in the United States and Europe.

In addition, the most recent research indicates that the health risks of using cannabis have been underestimated in the past. About 9 per cent of those who try cannabis find themselves unable to stop using the drug. Cannabis has been linked to precipitating psychosis in vulnerable individuals, and aggravating its symptoms in diagnosed schizophrenics. Cannabis can also produce negative acute effects, including panic attacks, paranoia, and psychotic symptoms.

Despite the popular perception that the risks of cannabis are widely understood, new research indicates that there is still much to be learned about the drug. At the same time, cannabis itself is changing, and more potent forms of the drug are growing in popularity. As cannabis is consumed by a significant share of the global population, monitoring these developments is essential.

Progress in coming to terms with cannabis is impeded by the lack of an international consensus on the topic, the drug conventions notwithstanding. National practices on cannabis have begun to diverge, and this fragmentation is impeding a coordinated and effective approach. It is high time the topic is revisited at the international level, so that what is truly a global issue can be tackled within the multilateral framework that was constructed for just such a purpose.

1. TRENDS IN WORLD DRUG MARKETS

1.1 The evolution of the world drug problem

The world drug situation in perspective

The *World Drug Report* tries to provide a comprehensive and up-to-date picture of the world drug situation. This is essential to assess the performance of drug control interventions and to guide policy-making. While data in this report is, in many cases, provided for at least the last ten years, most of its analysis emphasizes the most recent and most topical developments. Monitoring current developments is essential but it is also important to take a longer-term view to assess the performance of the multilateral drug control system.

The only real basis for an assessment has to be an answer to the question whether the drug problem is getting better or worse, and whether illicit drug production, trafficking and consumption are increasing or decreasing. Unfortunately, there is no definitive answer. Hard evidence – both qualitative and quantitative – is thin on the ground. The evidence becomes more and more patchy as one changes the time-span of the enquiry from a year, to a decade, to a century. Tracking a trend – changes between two points in time, usually the present and some point in the past – is difficult at the best of times, particularly when it concerns an illicit activity which is usually concealed. It is not enough to know the situation as it is now. Answering the question of whether the present situation is better or worse necessarily implies knowing what the situation was at the moment in the past with which one is comparing. This is usually called a baseline. It is obviously easier if the baseline and the present situation can be captured in some kind of quantitative measure. The trend can then be expressed in simple arithmetic: not just better or worse, but better or worse by a certain percentage. If there is no arithmetic, the trend can only be expressed by perception: when one is inclined to see the glass as half empty then the trend is worse; when one is inclined to see the glass as half full, then the trend is better.

There are thus at least three time-spans on which one can focus an assessment of trends in how the drug problem is evolving: changes from one year to the next, over a decade, and over a century. The first is appropriate, and possible, because the present Report is part of an on-going series of publications which are designed to show an annual trend. Indeed, the rest of this Report details the year-on-year trend in production, trafficking and consumption of illicit drugs. The second temporal focus, on a decade, is appropriate because of the milestone of the twentieth special session of the United Nations General Assembly devoted to countering the world drug problem together (UNGASS) in 1998, and the assessment of its goals and targets in 2008. This is not dealt with here because it will doubtless be examined, in some detail, in subsequent issues of the World Drug Report. The third temporal focus, on a century, is examined in the following paragraphs.

The drug control system is one of the oldest forms of multilateralism, spanning nearly a century. The use of psychoactive plants may have been with us for millennia, but a series of local or national drug problems only turned into an international problem in the beginning of the 20th century. The Shanghai Opium Commission of 1909 was convened in recognition of the fact that the causes and consequences of the problem went well beyond China. This is why the histories of drug control and of multilateral regulatory regimes are so closely inter-linked. The Shanghai Commission spawned the first instrument of international law to deal with psychoactive drugs: the Hague Opium Convention of 1912. It required each signatory to enact domestic legislation controlling narcotic drugs so they could be restricted to medical use. From these origins came a still continuing process of expanding domestic legislation in countries. It illustrates a unique dimension of all multilateral regimes. They have a mandatory nature. When countries become signatories to an international convention, they incur an obligation to enact complementary legislation and thus have to measure their own policies against international standards. The Shanghai Commission and Hague Convention also began a process that has evolved into the multilateral drug control system. The scope of control over drugs has broadened and deepened over the years, from opium to cocaine to cannabis to psychotropic substances, and from the regulation of production and trade of medical drugs to the goal of international cooperation against the multi-faceted problems associated with illicit drugs.

The legal framework for this whole multilateral control system is provided by the three international drug conventions.[1]

In the long-term, the drug problem has been contained

With regard to the performance of that multilateral system, there is evidence that, over the last hundred years, it has reduced and contained the drug problem at the global level. Tracking a long-term trend over a century is difficult because the evidence is in short supply. Some baselines can, however, be found. The best, in terms of detail, is for opium, because it was the opium problem which was investigated at the Shanghai Commission in 1909. Comparing the size of the opium problem in one country – China – at the beginning of the 20th century with the size of the opium problem in the world at large today, gives one some idea of how the problem has evolved over a century. Such a comparison has been made in a previous issue of this Report.[2] It is useful to recapitulate because it carries considerable explanatory power.

Just before the convening of the Shanghai Opium Commission, in 1907/1908, world opium production was estimated to have been at least 30,000 metric tons. Almost three quarters of this was produced in China, one-sixth in India and the rest in Indochina, Persia and Turkey.[3] Nearly a hundred years later, world opium production declined by more than 80% to around 5,000 tons in 2005, including 4,620 tons of illegal opium and some 400 tons of licit medical opium[4]. Over the same period, the population of the world grew three fold, from less than 2 billion to over 6 billion. Opium production is thus eighty per cent smaller in a world which is three times larger. There are of course, many other drugs today. But the trend is a powerful illustration of the containment of illicit drug production over a century, notably for the opiates which, despite this decline, are still the main problem drugs in the world, responsible for most drug related morbidity and mortality.

Another illustration of containment in the long-term can be derived from comparing the consumption of opium over a century. At the beginning of the 20th century, China alone is said to have had about 25 million opium users[5] .

Today, at the beginning of the 21st century, there are less than 16 million opiate users in the world (of which some 11 million use heroin). Again, there are many other psychoactive drugs available, and heroin is more dangerous than opium, but containment of the problem over a century still appears to be a sustainable argument.

A third argument in support of long-term containment is to compare illicit drugs with other licit, legitimately available, psychoactive drugs. The most instructive comparison would be between illicit drugs and tobacco. Though it is both psychoactive and addictive, nicotine was never put under the drug control regime. The recent World Health Organization Framework Convention on Tobacco Control does control tobacco products, but the approach is fundamentally different. Compared to illicit drugs, tobacco markets are relatively unregulated, relying on taxation, advertising and age-related controls of consumption. Comparing these markets with the much more strictly regulated markets for illicit drugs is, as noted above, instructive. The annual prevalence of tobacco use in the world is about one quarter (age 15+) of the world population – some 1.7 billion people. The annual prevalence of illicit drug use – taking all illicit drugs – is only 5 per cent of the world population (age 15-64) – some 200 million people. Tobacco consumption is thus eight-fold more than illicit drug consumption. Even more telling, tobacco claims 25 times as many lives as illicit drug abuse.[6] Had there been no drug control system, the size of the drug

1 The Single Convention on Narcotic Drugs of 1961 (United Nations *Treaty Series*, vol. 520, No.7515), the Convention on Psychotropic Substances of 1971 (*Ibid*, vol.1019, No. 14956) and the United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (*Ibid*, vol. 1582, No. 27627).

2 United Nations Office on Drugs and Crime, *World Drug Report 2004*, (United Nations publication, Sales No. E.04.XI.16) pp. 26- 27

3 International Opium Commission, Shanghai, China, 1-26 February 1909.

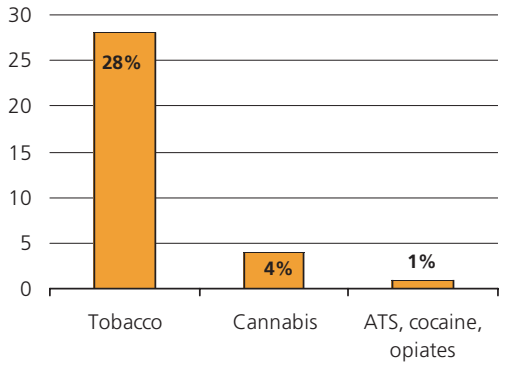
4 Licit opium estimate from the International Narcotics Control Board, as published in *Narcotic Drugs: Estimated World Requirements for 2006, Statistics for 2004* (United Nations publication, Sales No.E. 06.XI.3), p. 175. The estimate of licit opium production for the 2005 amounts to 374.3 tons, but may change. Illicit opium estimates are detailed in this Report in the chapter 'Opium/heroin market'.

5 International Opium Commission, Shanghai, China, 1-26 February 1909; Vol. 1, *Report of the Proceadings*, p.68.

6 The World Health Organization estimates that some 200,000 people died from drug abuse in the year 2000, equivalent to 0.4 per cent of all deaths worldwide. Tobacco, on the other hand, is said to claim about 5 million annually. United Nations Office on Drugs and Crime, *World Drug Report 2004*, (United Nations publication, Sales No. E.04.XI.16), Vol. 1, pp. 25-26.

using population, as well as the burden of disease associated with it, would have been much greater – perhaps even at levels close to tobacco. The multilateral drug control system therefore helped to contain the problem at 5 per cent of the world population (age 15-64) or less than one per cent if only problem drug use is considered. This is an achievement that should not be underrated and provides a useful perspective within which more recent developments can be analysed.

Fig. 1a: Use of all illicit drugs compared to use of tobacco (in % of world population age 15-64)



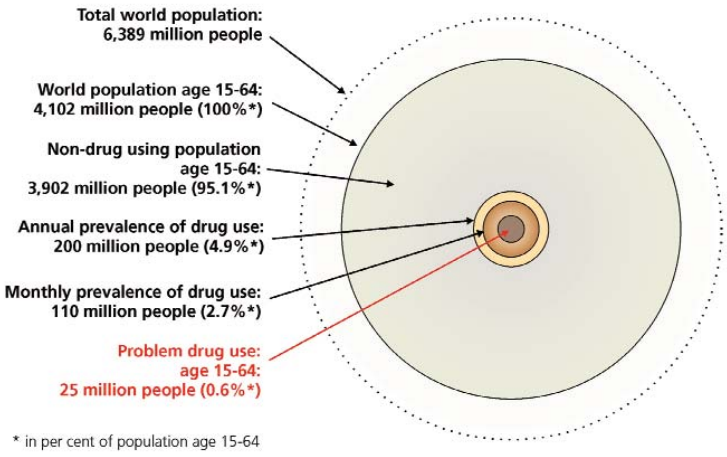
Estimated overall level of drug use in the world remains stable

Some 200 million people or 5 per cent of the world's population aged between 15 and 64 years have used drugs at least once in the previous 12 months. The global estimate of drug users thus remains the same as the estimate published in the 2005 *World Drug Report*. Increases in some drug categories (cannabis and ecstasy) were offset by some declines in others and by an observed tendency towards poly-drug abuse. However, changes in the estimates must be interpreted with caution because they not only reflect actual changes in the number of drug users but, to an unknown and probably large extent, changes in data collection and reporting methods as well.

Of all illicit drugs, cannabis remains by far the most widely used illicit drug. The number of cannabis users in the world surpassed the 160 million mark in 2005 and is now estimated at some 162 million people, or 4 per cent of the world's population in the 15-64 age group.

With some 35 million users, amphetamine-type stimulants (ATS)[7] are the second most widely used group of drugs in the world. Estimates for the 2006 *World Drug Report* are slightly higher than those presented in the previous year, reflecting an increase in the estimate of ecstasy users (22 per cent), due to increased reporting of ecstasy use in developing countries. The increase was particularly pronounced in Asia. The number of ecstasy

Fig. 1b: Illegal drug use at the global level



7 The group of amphetamine-type stimulants (ATS) encompasses amphetamines (amphetamine, methamphetamine), ecstasy (MDMA and related substances) and other synthetic substances (such as methcathinone, phentermine, fenetylline etc.).

Table 1: Extent of drug use (annual prevalence*) estimates 2004/05(or latest year available)

	All illicit drugs	Cannabis	Amphetamine-type stimulants		Opiates	of which heroin	Cocaine
			Amphetamines	Ecstasy			
(million people)	200	162.4	25	9.7	15.9	11.3	13.4
in % of global population age 15-64	4.9%	3.9%	0.5%	0.2%	0.4%	0.3%	0.30%

Annual prevalence is a measure of the number/percentage of people who have used an illicit drug at least once in the 12 month-period preceding the assessment. The annual prevalence estimate is derived from national survey results and extrapolations from partial information on the drug situation in the various countries.

Note: As drug users frequently take more than one substance (poly-drug use), the world total for all illicit drugs together is not equal to the sum of the estimates for each individual drug group.

Sources: UNODC, Annual Reports Questionnaire data, National Reports, UNODC estimates.

users in North America, on the other hand, is now clearly lower than a few years ago, reflecting successes in curbing supply and raising the awareness of the risks related to ecstasy consumption. Ecstasy use in Europe remained largely stable.

The global estimates of amphetamines users are now slightly lower, reflecting lower estimates for Asia, where more than 60 per cent of the world's amphetamines users are found. The lower overall estimate masks, however, ongoing increases of methamphetamine use in a number of Asian countries and in some African countries. Amphetamines use in Europe and in the Americas remained largely stable.

The number of opiate users in the world remains stable at around 16 million people (of which 11 million people abuse heroin). This mainly reflects increasing levels of opiate abuse in some parts of Asia (countries surrounding or close to Afghanistan) and Eastern Europe (C.I.S. states) which exceeded the declines reported from a number of countries in East and South-East Asia and from Australia. In Africa, the estimated number of heroin users now approaches the one million mark, reflecting spillover effects from increased heroin trafficking through that region.

Estimates of the number of cocaine users – some 13 million people – are slightly lower than last year, though almost unchanged from those made for the late 1990s. The estimates suggest that at the global level, at least, the upward trend in cocaine consumption has come to a halt, notably in the Americas. This positive trend, however, goes hand in hand with the observation that in a number of other countries cocaine consumption continues rising.

Trends in annual prevalence estimates show moderate increases

UNODC global prevalence estimates suggest that overall drug use has been rising, over the last few years, mainly due to increased levels of cannabis and ecstasy use.

No significant changes were observed for most other drugs. Use of amphetamines is more widespread than in the late 1990s but seems to have declined as compared to the early years of the new century.

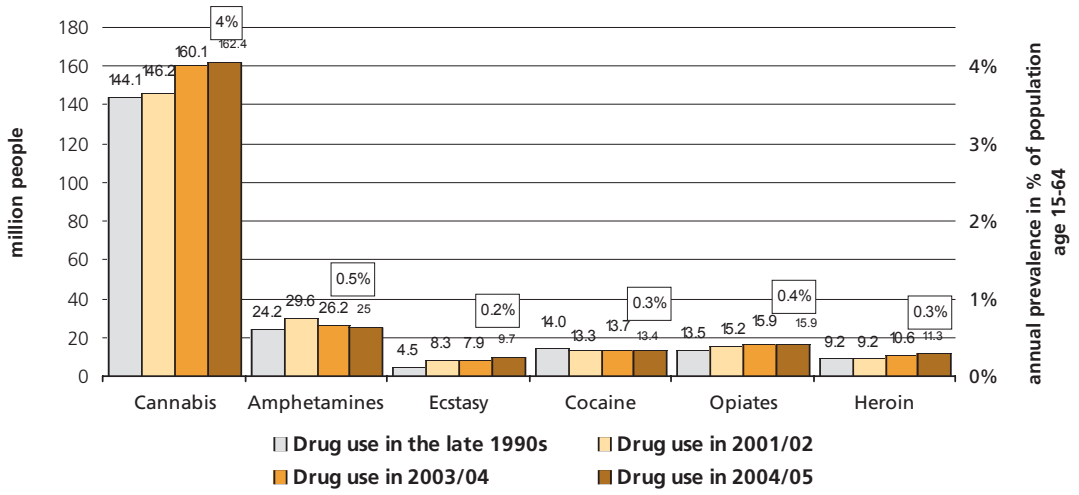
These results are indicative of underlying drug use trends but, due to frequent lack of data availability, they should not be mistaken as scientific proof of such trends[8].

Drug Use Trends move upwards

In addition to estimates of the total number of drug users, UNODC collects Government experts' perception of national drug use trends as part of the Annual Reports Questionnaire (ARQ). Based on this information, UNODC establishes drug trend indicators for the four main drug categories: opiates, cocaine, cannabis, amphetamine-type stimulants.

8 Scientifically valid prevalence studies - even 8 years after UNGASS where Governments pledged to undertake such studies in regular intervals - are still very limited and lacking in many countries or must be considered outdated (in some countries the most 'recent' studies date back to the mid 1990s) . Thus, changes in the underlying data material could also reflect availability of new studies or better estimates rather than changes in drug consumption.

Fig. 2: UNODC estimates of illicit drug use, late 1990s to 2004/2005



Sources: UNODC, Annual Reports Questionnaire data, National Reports, UNODC estimates, UNODC, World Drug Report 2000, 2004 and 2005.

Drug use trends are reported by Government experts for the following categories: 'large increase', 'some increase', 'no great change', ' some decrease', 'large decrease'. These reported trends are then weighted by the size of the countries' drug using populations, in order to more accurately reflect the overall trend at the global level[9].

The main advantage of this method is that far more countries are in a position to provide perceptions of drug use trends rather than actual estimates of the number of drug users in their countries. The underlying problem remains, however, that without proper drug monitoring systems in place, perception is not necessarily a very reliable measure of actual drug use trends. These caveats must be kept in mind in interpreting the following results.

Compared to the estimates published in 2005 *World Drug Report*, the drug use perception trends were as follows:

- Cannabis use is perceived to be increasing further;
- For the first time in years, cocaine use was perceived as declining slightly;
- Upward trends are perceived for both opiate use and ATS use, including ecstasy.

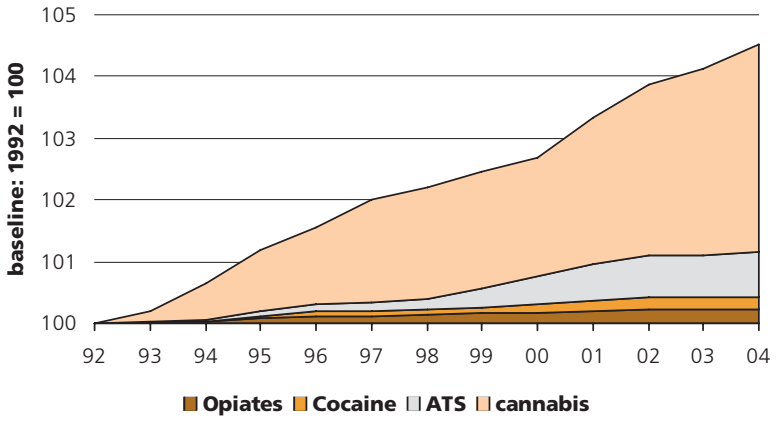
Over the last twelve years, the strongest increases in drug use were perceived for cannabis and amphetamine-type stimulants. Increases in opiates and cocaine were less pronounced.

In addition to respective individual drug trends, an overall drug use perception trend indicator was established, based on the results of the main drug categories and weighted by their importance for overall drug consumption. This composite index (figure 3) suggests that cannabis was responsible for most of the increase in global drug use over the last decade, followed by the amphetamine-type stimulants.

The perceived increase in drug use over the last decade must be also seen in a wider context. If all Governments had reported 'some increase' in each year, the trend data would have shown a value of 112 after 12 years (1 point per year); and if all countries had report 'strong increases' the value would have amounted to 124 (2 points per year). The actual composite index, based on the drug trend data reported by Member States, shows a value of 104.5 after 12 years, reflecting the fact that drug use did not increase in all countries, but remained stable or declined in some countries. The actual drug use perception trend after 12 years lies in between 'not much change' and 'some increase' and is actually closer

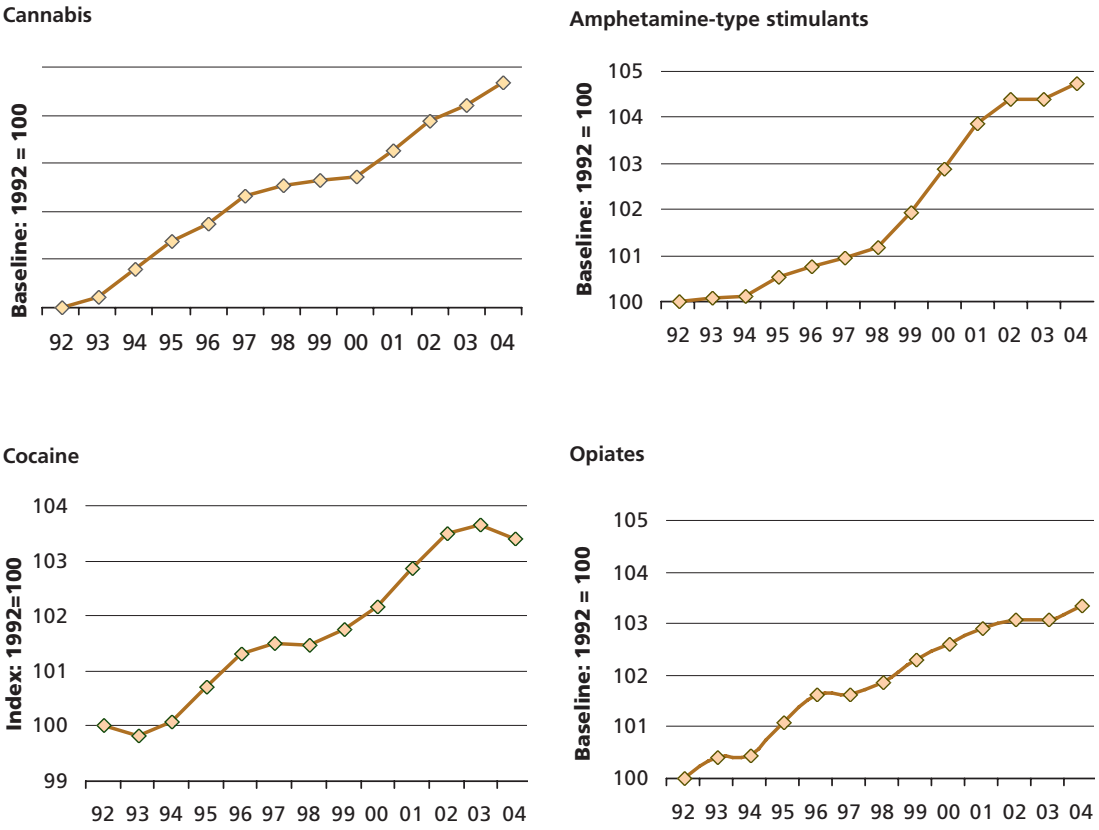
9 A detailed explanation on the establishment of the drug use perception trends is shown in the section on methodology in Volume 2 of the present report.

Fig. 3: Drug use trends - all drugs (based on expert opinion, weighted by the estimated number ofusers)



Sources: UNODC, Annual Reports Questionnaire Data (for trends) and UNODC drug use estimates (World Drug Report).

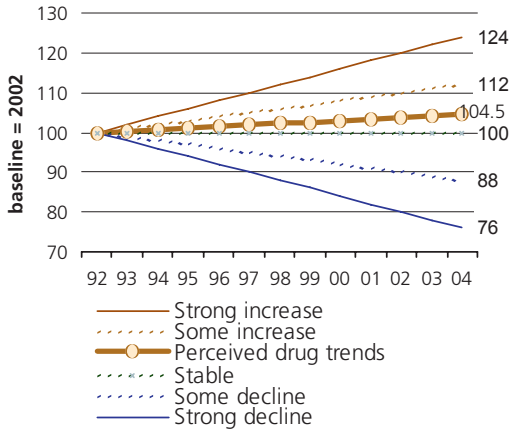
Fig. 4: Twelve year trends (as perceived by expert, weighted by the estimated number of users)



Sources: Annual Reports Questionnaire Data for trends and UNODC, WDR 2005 estimates of the number of drug users.

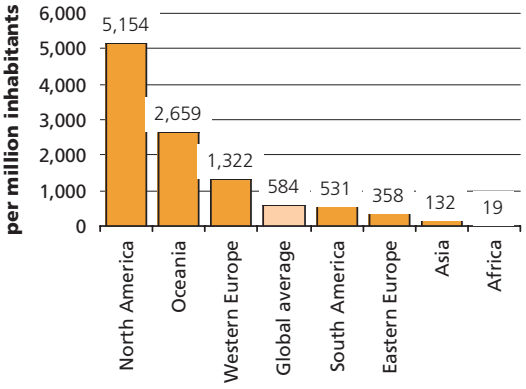
to a stable (100) trend than to a rising trend ('some increase': 112).

Fig. 5: Twelve year drug use, as perceived by experts



Sources: UNODC, Annual Reports Questionnaire Data (for trends) and UNODC drug use estimates (World Drug Report).

Fig. 6: Drug treatment per million inhabitants in 2004



Source: UNODC, Annual Reports Questionnaire data / DELTA.

Treatment demand is highest in North America, Oceania and Western Europe

The demand for drug abuse treatment is an important indicator for assessing the world drug situation and provides an idea of the type of drugs that cause the biggest burden on national health systems. Member States reported a total of 3.7 million people under treatment for drug abuse to UNODC. The actual world total is likely to be larger as many countries do not have comprehensive treatment registry systems. For comparison, UNODC estimates that some 25 million (0.6 per cent of the world's population age 15-64) are drug dependent.

Based on reported data, some 580 persons per one million inhabitants were treated for drug abuse in 2004. The highest numbers of drug treatment per million inhabitants are found in North America (5,200), followed by Oceania (2,700) and Western Europe (1,300). All other regions show values below the global average. The lowest numbers have been reported from Asia (132) and from Africa (19), reflecting the lack of appropriate treatment structures in many of the countries of these regions.

Treatment demand for opiate abuse continues to be highest in Asia and Europe

In Asia and Europe - home to more than 70 per cent of the world's total population - opiates account for the bulk of drug-related treatment demand (65 per cent and 59 per cent respectively in 2004[10]). The proportion of opiate-related treatment demand has been on the decline, in both Europe and Asia since the late 1990s[11]. This reflects increasing abuse of other drugs (cannabis, cocaine and ATS in Europe and ATS and cannabis in Asia) as well the decline of opium production in South-East Asia and, in 2001, in Afghanistan. It should be noted, however, that since the resumption of opium production in Afghanistan, opiate-related treatment demand in Asia has grown slightly (from 63 per cent in 2002/03 to 65 per cent in 2004).

In Oceania, opiates used to be the primary drug resulting in treatment demand (66 per cent in the mid

10 Difficulties faced here are that some countries only have data available from a few clinics whereas others have country-wide monitoring systems in place. Simply adding up the number of people treated for the various drugs would give a strong bias in favour of the countries which have nationwide monitoring systems in place while disregarding the information provided by others. In order to overcome this problem, the proportions at the country level were first calculated and, based on these results, the (unweighted) averages for the respective region were derived. The data shown are those reported for 2004; in case no data for a specific country were reported for 2004, data obtained from previous years were used or, if available, data for 2005.

11 The subsequent comparisons are based on treatment data statistics compiled and published in the 2000 *World Drug Report*.

1990s). This proportion declined in the wake of the Australian heroin shortage of 2001. In 2004, demand for opiate related treatment was thus considerably lower (34 per cent). Interestingly, treatment demand for opiate use was even lower than that for cannabis-related treatment (36 per cent).

Treatment for cocaine abuse is highest in the Americas but the strongest increase is recorded in Europe

For South America, cocaine continues to account for most of the drug abuse related treatment demand (54 per cent) though the proportion has declined since the late 1990s (down from 65 per cent). High proportions of cocaine related treatment demand are also encountered in North America (41 per cent). The strongest increase in cocaine related treatment demand was observed in Europe (rising from 3 per cent to 7 per cent). Cocaine is still mainly a problem of Western Europe, where it accounts for more than 10 per cent of treatment demand; in Eastern Europe the proportion is at less than 2 per cent.

Cannabis-related treatment demand remains highest in Africa

For Africa, most of the demand for drug use treatment is linked to cannabis (63 per cent 2004), but demand for opiates related treatment (12 per cent) has increased in recent years, notably in Eastern Africa. Spill-overs from trafficking of opiates via these countries to Southern Africa, Western Africa and Europe seem to have been responsible for higher heroin abuse levels. Paradoxically as heroin production in Latin America (Colombia and Mexico) is declining, heroin transit trafficking from South-West Asia via Africa to markets in North America might lead to further increases of heroin abuse in Africa in the future.

Treatment demand for cannabis has increased in most parts of the world since the late 1990s. It increased in North America (from 23 per cent to 43 per cent) and is now at levels similar to cocaine-related treatment demand. Increases in cannabis-related treatment demand were also reported from South America (from 15 per cent to 24 per cent), Europe (from 10 per cent to 16 per cent), Oceania (from 13 per cent to 36 per cent) and Asia (from 9 per cent to 12 per cent).

Treatment demand for ATS is highest in East & South-East Asia, Oceania, North America and Europe

The proportions of ATS abuse-related treatment demand are highest in Oceania (19 per cent) and in Asia (17 per cent), followed by North America (12 per cent) and Europe (10 per cent). In most regions, ATS-related treatment demand is now higher than in the late 1990s. Treatment demand for ATS rose in Oceania from 12 per cent to 19 per cent; in Asia from 12 per cent to 17 per cent; in North America from 5 per cent to 12 per cent, in Europe from 8 per cent to 10 per cent and in Africa from 3 per cent to 6 per cent of all drug related treatment demand between the late 1990s and 2004.

The highest proportion of ATS related treatment demand are found in East & South-East Asia (unweighted average 32 per cent in 2004). In a number of countries, including the Philippines, Japan, Republic of Korea and Thailand, more than half of all drug-related treatment is related to methamphetamine abuse.

In North America, methamphetamine treatment demand is highest in the United States and in some areas of Mexico and Canada bordering the United States. In 2004, about 18 per cent of overall treatment demand was linked to the abuse of amphetamine-type stimulants in the United States. Traditionally a phenomenon of the western and south-western states of the United States, methamphetamine abuse and related treatment demand, have spread eastwards over the last decade and already affect many of the Midwestern states. Treatment demand for methamphetamine abuse is still low in the Northeast but it seems to be only a question of time until those states will also suffer the consequences of large-scale methamphetamine abuse and will require related treatment.

In Africa, rising levels of methamphetamine abuse have been felt most acutely in South Africa where ATS-related treatment accounted for 14 per cent of overall treatment demand in that country. Most other ATS-related treatment demand in Africa is linked to licit pharmaceutical products diverted to illicit drug markets.

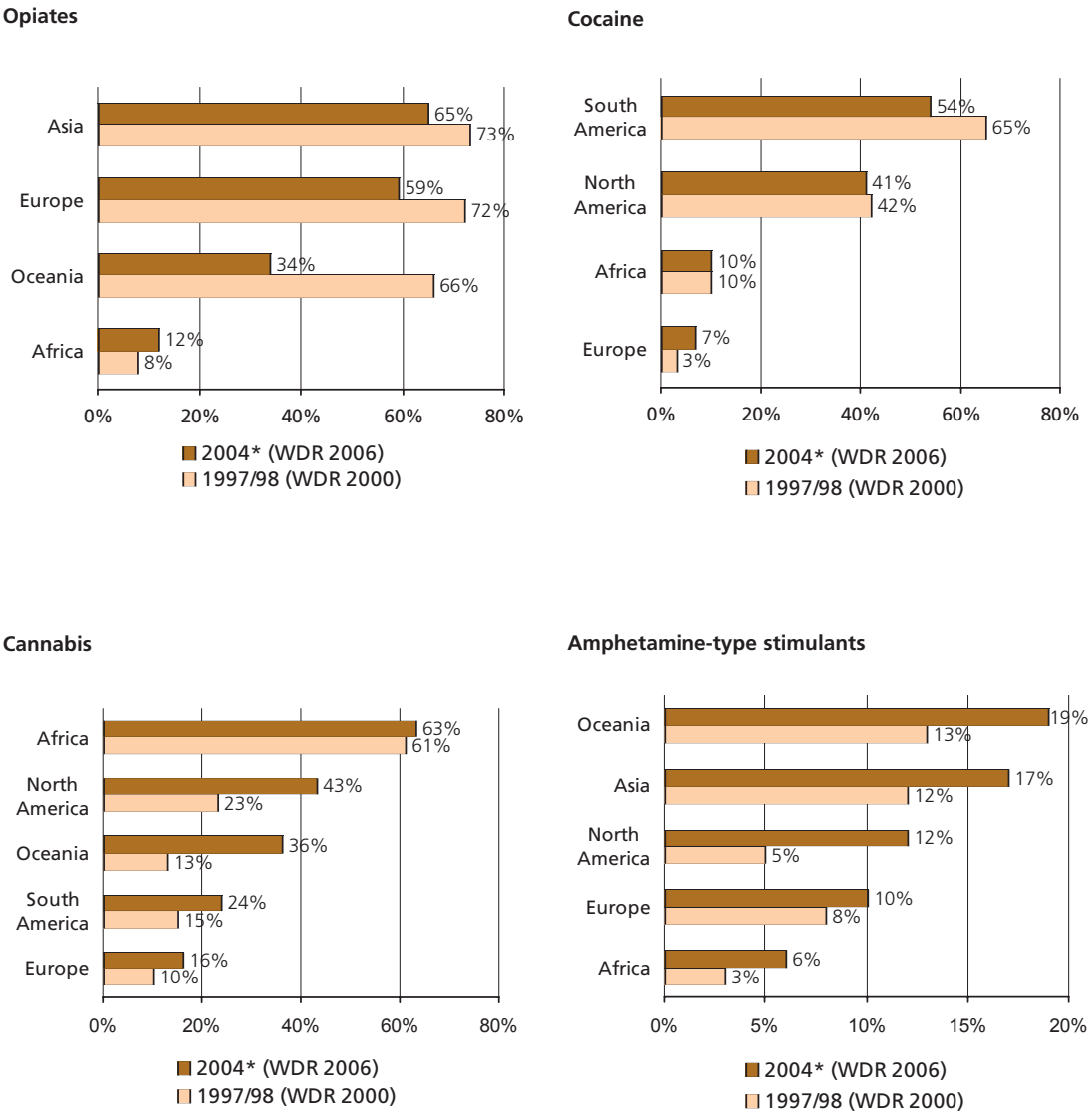
In Europe, only the Czech Republic reports methamphetamine to be a major problem (54 per cent of all treatment demand in 2004). This substance is also being used in a few other European countries such as Slovakia (24 per cent of treatment demand), Estonia, Latvia and, albeit at very low levels, United Kingdom. Demand for treatment for other ATS, notably amphetamine, is, relatively high in several of the Nordic countries (Iceland, Finland and Sweden).

Treatment demand for cannabis and ATS abuse on the rise

By drug, the picture for treatment demand can be summarized as follows:

- *Cannabis* is increasingly requiring treatment in North America, Oceania, Europe, Africa, South America and Asia;
- *Cocaine* has declined in overall drug treatment in the Americas, but continues rising in Europe;
- *Opiates* have declined in overall treatment in several regions;
- *ATS* in treatment has increased in Asia, North America, Europe and Africa.

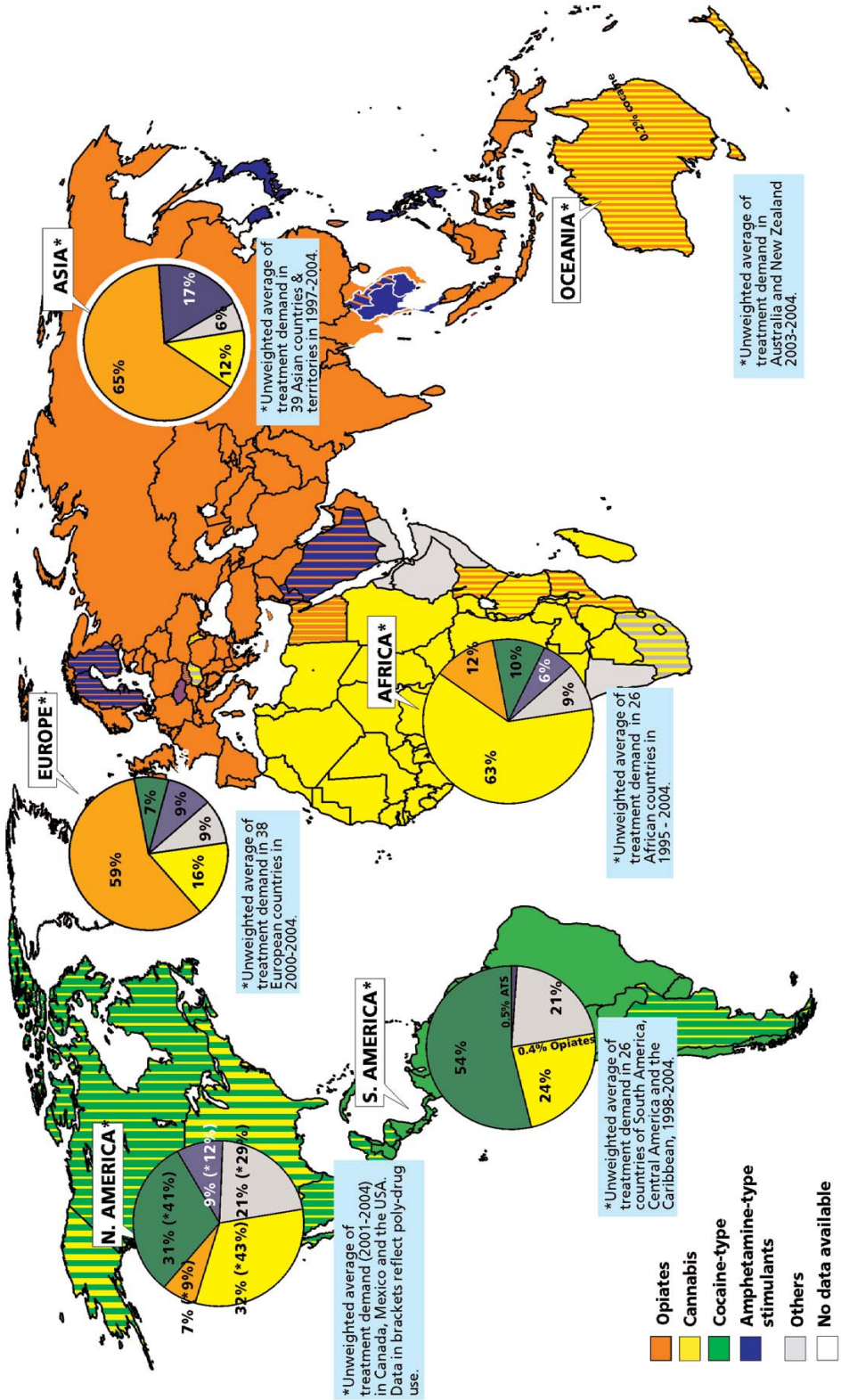
Fig. 7: Proportion of people in drug treatment for specific substances - 1997/98 and 2004



* 2004 or latest year available.

Sources: UNODC, Annual Reports Questionnaire Data; National Govt. report; reports by regional bodies.

Map 1. Main problem drugs (as reflected in treatment demand) in 2004 (or latest year available)



Source: UNODC, Annual Reports Questionnaire Data/DELTA and National Governments Reports.

Seizures remain an important indicator of the world drug problem

Seizure statistics are a further source of information on the evolution of the world drug situation. Their main advantage is that they are systematically and comprehensively recorded and reported by most Member States. As they have been reported since the times of the League of Nations, seizure statistics are in fact the largest time-series drug data, thus allowing for long-term analysis of the evolution of drug markets.

It is, however, clear that the capacity to make seizures varies considerably among nations. This has to be taken into account in making comparisons among countries. There are also some basic problems related to the recording of seizures. One such problem is non-reporting which, although it has declined over the years, can still be a problem for some regions.

Secondly, if more than one law enforcement body is involved in making drug seizures - and this seems to be increasingly the case - there is a potential danger of double counting. This can be the case both within countries as well as between countries[12].

Another problem is that it may take a long time to dismantle major drug trafficking networks. Once a drug ring is dismantled and seizures are made in a specific year, it would be wrong to interpret such seizures as proof of rising drug trafficking activities in that specific year. Finally, seizures and the related dismantling of drug trafficking networks could lead to a reduction of drug trafficking operations in the subsequent period; but it is equally possible that seizures made are just the tip of the iceberg, and more seizures are an indication of intensified drug trafficking operations.

All of these shortcomings have cast doubt as to the validity and usefulness of collecting seizure data. Nonetheless, experience has shown that seizure data, in combination with other indicators (such as purity data, price data and, if available, drug production estimates, treatment data, arrest data, drug use survey data etc.) are a very powerful tool for investigating major trafficking flows and their trends. In particular, when larger geographical units are investigated (subregions or regions) and seizures are looked at over longer periods of time, they have proven to be rather good reflections of underlying trafficking trends. Drug seizures have, in general, been in line with drug production trends (though gradually showing higher interception rates) and, in the main consumer markets, with drug consumption trends.

Seizure data can be examined from three different angles:

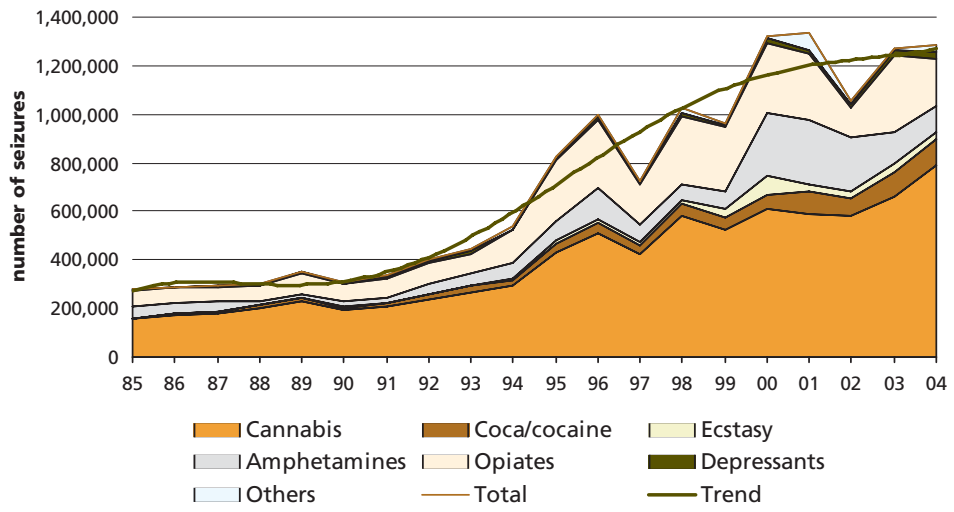
- the number of seizures cases
- the quantities of drugs seized and
- the number of drug units seized.

Number of seizure cases increases slightly in 2004

A total of 1.3 million seizure cases were reported to UNODC from 93 countries in 2004 (+1 per cent). However, a number of countries (19 in total) had reported seizure cases to UNODC in 2003, but not in 2004 (Instead, another 19 countries had reported seizure cases to UNODC in 2004, but not in 2003). Assuming that the overall number of seizure cases of the non-reporting countries was not zero but the same as in 2003, the total number of seizure cases would have increased to 1.36 million (+8 per cent on a year earlier), i.e. marginally higher than the seizure cases reported in 2000 and 2001. Comparing the seizure cases of the countries reporting in both 2003 and 2004, the increase would have amounted to 6 per cent - which is still less than the long-term rate of increase. As compared to 1985, seizure cases increased by 8 per cent on average per year, or 4 ½ fold in total. Most of the increase took place in the 1990s (+16 per cent per year over the 1990-2000 period).

12 A seizure case made by customs and then handed over to the police, may, in some countries, enter the police registry as well. This could result in double counting once the police seizure statistics and the customs seizure statistics are aggregated at the national level. There could be also potential problems of double counting once seizures are done in cooperation between local police and the national (federal) authorities. Similarly, it cannot be excluded that a seizure made, for instance, on a ship, in close cooperation between drug law enforcement agencies from two countries, are recorded in both countries as a seizure, thus leading to double counting once the consolidated country reports, sent to international bodies, are aggregated. The likelihood of double counting may also have increased in recent years following the introduction of seizures as one of the performance indicators of police forces. A possible solution to this problem would be to extension of the existing performance indicators to a category of 'seizures made in cooperation with other law enforcement bodies', which could still allow enforcement bodies to take credit for their work while avoiding double counting.

Fig. 8: Number of seizure cases, 1985-2004

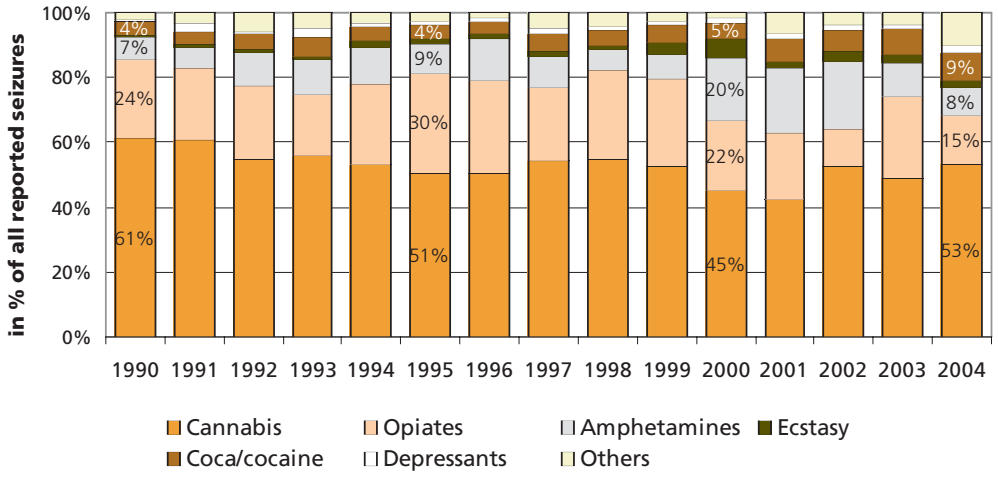


Sources: UNODC, Annual Reports Questionnaire Data/DELTA.

Cannabis accounted for 53 per cent, opiates for 15 per cent, amphetamine-type stimulants (including ecstasy) for 10 per cent and cocaine for 9 per cent of total drug seizure cases reported in 2004. These four drug groups thus accounted for 88 per cent of all drug seizures made in 2004.

The most striking trend over the last few years has been the increase in cannabis seizures. After having declined in relative terms between 1990 and 2000, the proportion of cannabis in overall drug seizure cases increased from 45 per cent in 2000 to 53 per cent in 2004. The proportions of most other drugs declined accordingly. The only exception was cocaine. Its share in global seizure cases rose from 5 per cent in 2000 to 9 per cent in 2004.

Fig. 9: Proportion of seizure cases according to drug category, 1990-2004



Source UNODC, Annual Reports Questionnaire Data / DELTA.

Table 2: Number of countries reporting drug seizures in 2004

Drug	No. of countries
Cannabis herb	135
Cocaine	119
Heroin	114
Cannabis resin	83
Ecstasy	69
Opium	60
Amphetamine	47
Methamphetamine	42
LSD	40
Depressants	40
Morphine	34
Crack-cocaine	32
Khat*	19
Cannabis oil	19
Methadone	11
GHB	9
Methaqualone	8
Ketamine*	6
* Not under international control	

Largest quantities of seized drugs are cannabis, cocaine and opiates

Turning from the number of seizure cases to the quantities seized, a total of 119 countries reported such information to UNODC in 2004. Including information obtained from other sources[13], seizure information from 152 countries and territories is included in UNODC's database (DELTA) which forms the basis for the subsequent analysis. Quantities of drugs seized are thus the most comprehensive drug data set available.

Table 3: The largest quantities of drugs seized in 2004 (rounded) concerned

Drug	Quantity in tons
Cannabis herb	6,200
Cannabis resin	1,500
Coca leaf	1,200
Cocaine	590
Opium	210
Heroin & morphine	100
Khat	97
Amphetamines	20
Ecstasy	8
Methaqualone	5
Other depressants	2

… with significant increases observed for ecstasy, opium, cannabis herb, and cocaine

For the various drug groups changes in 2004 as compared to a year earlier were as follows:

Cocaine:	+18 per cent
Opiates (in heroin equivalents):	+9 per cent
Cannabis:	+6 per cent
ATS:	-11per cent

The strongest increases in seizures for individual drugs in 2004 as compared to a year earlier were for:

Ecstasy:	+87 per cent
Opium:	+57 per cent
Khat:	+40 per cent
Coca leaf:	+29 per cent
Cocaine:	+18 per cent
Heroin:	+13 per cent
Cannabis herb:	+ 6 per cent
Cannabis resin:	+ 6 per cent
Amphetamine:	+ 5 per cent

13 Government reports, UNODC Field Offices, Drug Abuse Information Network for Asia and the Pacific (DAINAP), Interpol, World Customs Organization (WCO), International Narcotics Control Board (INCB), EUROPOL, Comisión Interamericana para el Control del Abuso de Drogas (CICAD), United States State Department International Narcotics Control Strategy Report etc.

The increase in ecstasy seizures was particularly high as the base year for comparison (2003) was rather low. Nonetheless, as compared to the year 2002 ecstasy seizures were still 20 per cent higher, and they were the highest ever reported.

The increase in opium seizures reflected the re-emergence of large-scale opium production in Afghanistan. As compared to 2001 (the year of the Afghan opium ban) and 2002, global opium seizures doubled. Global opium seizures were, however, still slightly lower than in 1999/2000 (Afghanistan's peak harvest of 1999) and 1994 (reflecting the previous peak in Afghanistan's opium production). While heroin seizures increased, morphine seizures declined in 2004. Heroin and morphine seizures, taken together, remained roughly stable.

Seizures of khat – which is under control in a number of countries though not under international control – increased strongly in 2004 but were still 80 per cent lower than in 2002.

Both seizures of coca leaf and of cocaine turned out to be the highest ever reported. At first sight, this may seem surprising since the area under coca cultivation has declined since the year 2000 and remained largely stable in 2004. However, reductions in the area under cultivation seem to have been largely offset by higher yields and improved cocaine processing capabilities. Still more important, greater enforcement effort and improved cooperation among enforcement agencies helped to increase seizures.

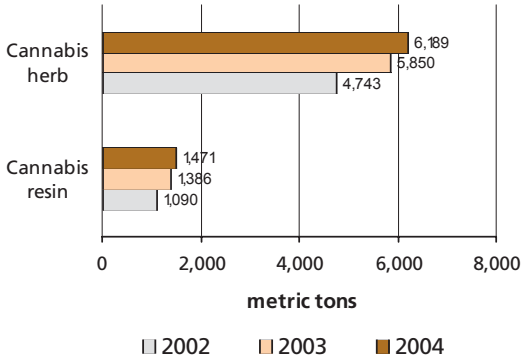
Strongest declines reported for GHB, LSD, methamphetamine and morphine

The strongest declines in global drug seizures in 2004 were observed for GHB (-85 per cent), LSD (-51 per cent), methamphetamine (–50 per cent) and morphine (-10 per cent).

Long-term trends show increases primarily for synthetic drugs and cannabis

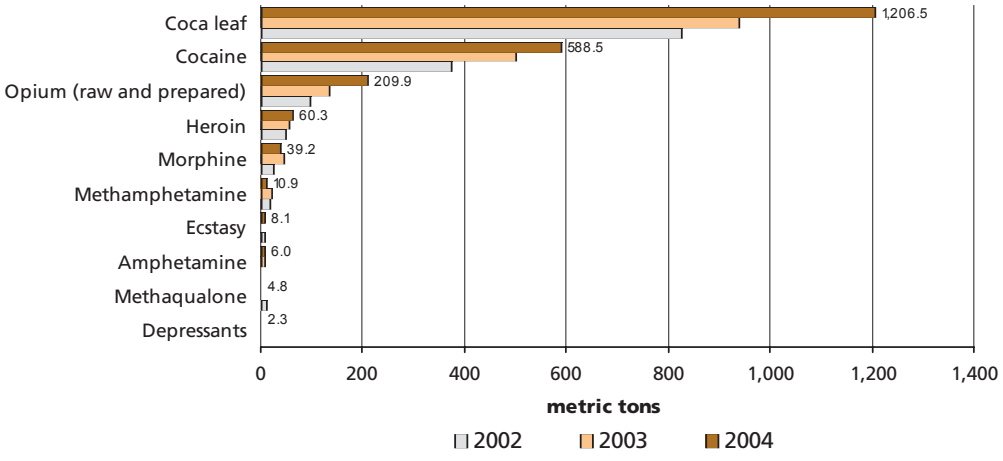
The analysis of seizure data over longer periods is more relevant for the identification of underlying trafficking

Fig. 10: Global cannabis seizures (in weight equivalents), 2002-2004



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

Fig. 11: Global drug seizures, excluding cannabis (in weight equivalents), 2002-2004



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

trends. The strongest increases in seizures over the 1994-2004 period were reported for:

- depressants (mainly diverted pharmaceuticals such as benzodiazepines and barbiturates) which have, on average, increased by 21 per cent every year, and
- ecstasy (21 per cent per year)

The second largest increases over the ten-year period were observed for the amphetamines (amphetamine and methamphetamine). Seizures of amphetamines increased, on average, by 12 per cent per year. Even the strong decline of amphetamines seizures in 2004 (-26 per cent) has not changed this trend.

Seizures of cannabis herb have shown larger increases (10 per cent per year) than seizures of cannabis resin, which grew only at a rate of 5 per cent per year. This reflects the stronger expansion of the market for cannabis herb in many countries.

Growth in heroin and morphine seizures together amounted to 9 per cent per year, reflecting the trend towards further processing of opium into morphine and heroin in the producer countries. As a consequence, the proportion of morphine and heroin in the trafficking of all opiates has risen over the last decade.

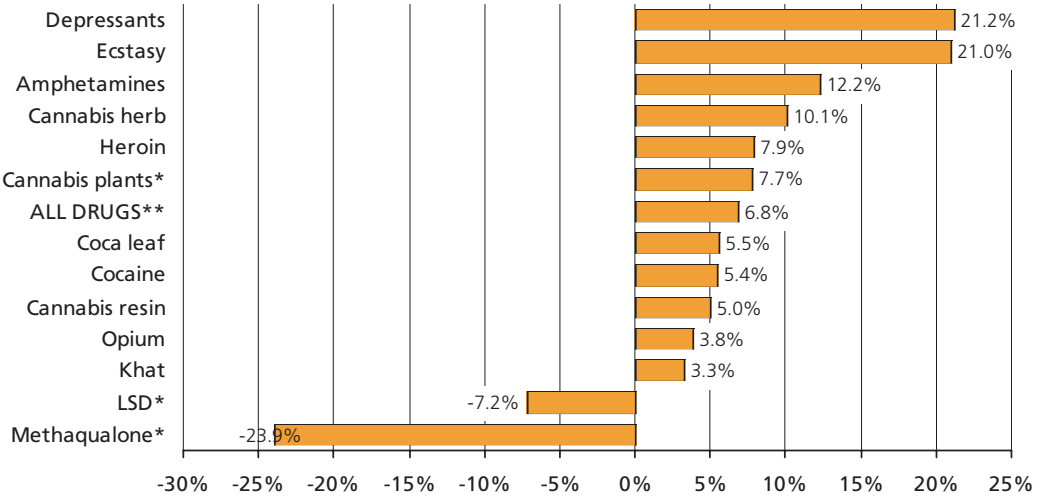
Seizures of coca leaf and of cocaine (5½ per cent per year) were below the average for all drugs (7 per cent per year).[14] This is probably due to the fact that cocaine production has remained largely stable over the last decade. Increases in seizures were mainly the consequence of improved enforcement activities.

The strongest declines in seizures over a long term period were observed for methaqualone, which is primarily seized in countries of southern Africa, and for LSD. This is in line with other indicators showing a decline in production and abuse of these substances over the last decade.

Seizures in unit terms continue to climb in 2004

The analysis of quantities of drugs seized allows for the identification of growth rates of the seizures of various drugs. However, as the quantities of drugs seized are not directly comparable, it is difficult to draw conclusions on overall drug trafficking patterns. Since the ratio of

Fig. 12: Average annual change in seizures, 1994-2004

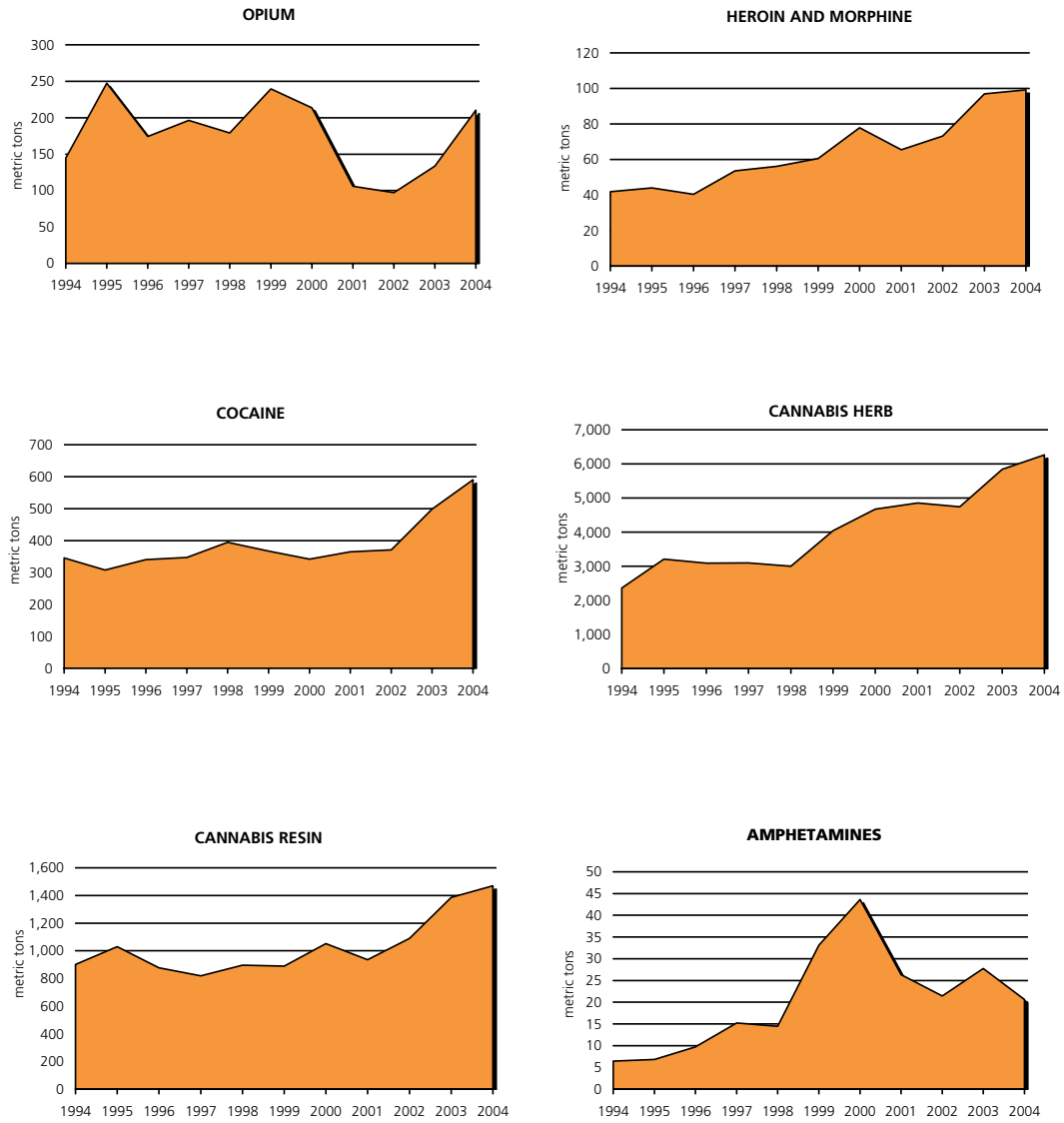


* seizures in units; ** seizures transformed into unit equivalents

Source: UNODC, Annual Reports Questionnaire Data / DELTA.

14 This average for all drugs was calculated on the basis of unit equivalents.

Fig. 13: Trends in world seizures, 1994-2004 (in metric tons)



weight-to-psychoactive effects varies greatly from one drug to another, the indicator weight of seizures assumes more utility if it is converted into a typical unit of consumption, or the dose taken by drug users to experience a high.[15] Expressing drug seizures in such typical units/doses enables a more meaningful comparison of the quantities of different drugs seized.

Typical doses tend to vary across countries (and sometimes across regions within a country), across the various substances aggregated under one drug category (e.g. commercial cannabis herb and high-grade cannabis herb), across user groups and across time. Unfortunately, such detailed conversion ratios are not available. Comparisons made here are based on global conversion rates of grams/milligrams per dose. The results should be thus interpreted as indications of overall patterns rather than precise estimates.

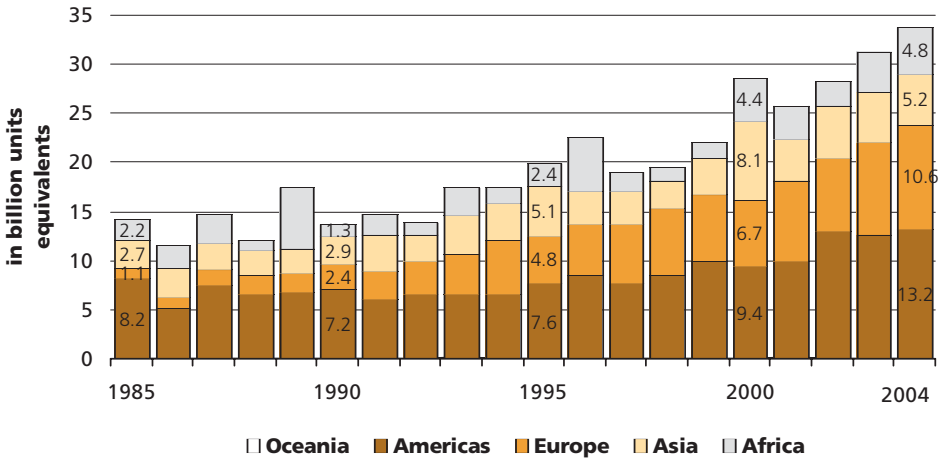
Based on such calculations, global seizures reported in 2004 were equivalent to some 34 billion drug units (doses). This is equivalent to an increase of 7.6 per cent as compared to a year earlier. The increase in 2004 was thus stronger than the average annual growth rate over the 1994-2004 period (6.8 per cent). Global drug seizures almost doubled over this period.

The increase in seizures took place across all regions. In 2004, most seizures were made in the Americas (39 pe cent), followed by Europe (31 per cent), Asia (15 per cent), Africa (14 per cent) and Oceania (0.2 per cent).

While most seizures continue to be made in the Americas, the strongest increases have been reported from Europe. The proportion of Europe in total seizures rose from 17 per cent in 1990 to 26 per cent in 2000 and 31 per cent in 2004, suggesting that drug trafficking has also increased in this part of the world. The proportions of seizures made in North America, in contrast, remained largely stable (25 per cent in 1990, 25 per cent in 2000 and 26 per cent in 2004). The proportion of seizures made in other parts of the world fluctuated strongly year on year, so that it is difficult to identify any clear trends. The proportion of seizures made in South America ranged from 11 per cent to 27 per cent over the 1990-2004 period, in Asia from 15 per cent to 26 per cent, in Africa from 7 per cent to 24 per cent and in the Oceania region from 0.2 per cent to 0.7 per cent.

On a per capita basis, data suggest that drug trafficking is most widespread in North America, followed by Europe. Most drugs in 2004 were seized in North America (21 doses per inhabitant per year), followed by Europe (15 doses) and South America (10 doses per inhabitants). The global average was 5 doses per inhabitant. Per capita seizures in Africa were close to the

Fig. 14: Regional breakdown of drug seizures in unit equivalents, 1985-2004

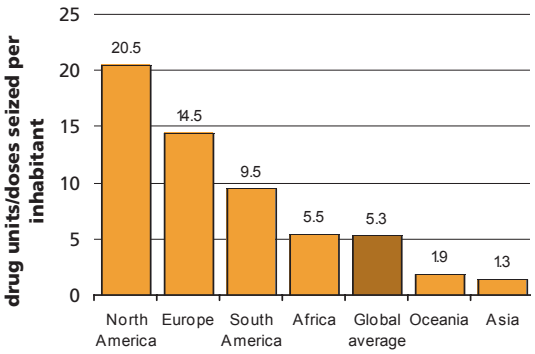


Source: UNODC, Annual Reports Questionnaire Data / DELTA.

15 For the purpose of this calculation, the following typical consumption units/doses (at street purity) were assumed: cannabis herb 0.5 grams; cannabis resin 0.135 grams; cocaine and ecstasy 0.1 grams; heroin and amphetamines, 0.03 grams; LSD 0.00005 grams (50 micrograms).

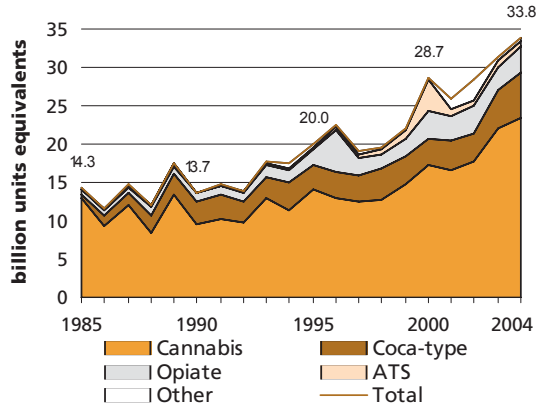
global average, mainly reflecting high levels of cannabis seizures. The lowest per capita levels were reported from Asia (1 dose per inhabitant). However, the Near & Middle East /South-West Asia region had a rate that was twice the global average (10 doses per inhabitant), reflecting large-scale trafficking of drugs originating in Afghanistan.

Fig. 15: Drug doses seized per inhabitant in 2004



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

Fig. 16: Global drug seizures in unit equivalents, 1985-2004



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

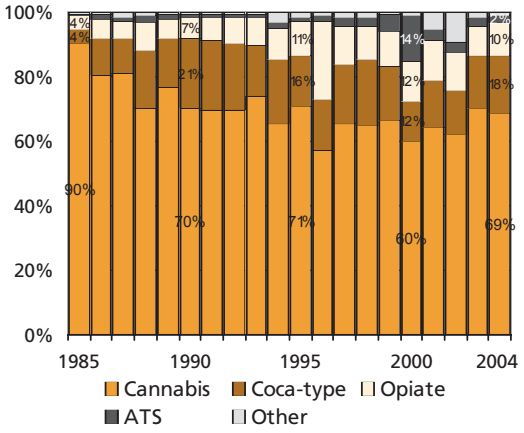
Seizure in unit terms can also shed some slight as to the relative importance of various drugs in trafficking. The most important drugs in terms of seizures, expressed in unit equivalents, at the global level are cannabis (69 per cent), followed by cocaine (18 per cent), opiates (10 per cent) and ATS (2 per cent).

Though cannabis seizures increased in absolute terms, their proportion in all seizures declined over the 1985-2000 period, from 90 per cent to 60 per cent. However, since 2000, the proportion of cannabis in all seizures has been rising again and reached 69 per cent in 2004, reflecting rising levels of cannabis production and cannabis use and also rising levels of cannabis trafficking. The only other drug which showed rising proportions in recent years was cocaine (from 12 per cent in 2000 to 18 per cent in 2004, though the proportion of cocaine in total seizures is lower than in 1998 (20 per cent) or in 1994 (20 per cent)).

Comparing seizures expressed in doses and the reported drug seizure cases, it becomes apparent that – except for cannabis – the ranking of the most trafficked drugs differs. While opiates and ATS are the second and third most widely seized substance in terms of seizure cases, followed by cocaine; in terms of drug dosages seized, cocaine ranks second, ahead of opiates and ATS. This reflects the fact that at the global level far larger drug quantities are seized, on average, per cocaine seizure (4.3 kg in 2004) – often found on ships or containers - than per heroin (0.3 kg) or ATS (0.2 kg) seizure.[16]

Containment of opium and cocaine production: in

Fig. 17: Proportion of drug categories in seizures, in unit equivalents



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

16 This calculation was based on information from countries providing both seizures in weight terms and the number of seizure cases for various drugs for the year 2004.

2005, opium declined and cocaine remained stable

For coca and opium, the two substances for which UNODC, in collaboration with the Governments concerned, has been undertaking detailed surveys, the situation looked quite positive for 2005. While for 2004 opium/heroin production and cocaine production had still increased, global opium production declined in 2005 by 5 per cent and cocaine production decreased by 3 per cent. The global area under opium cultivation was 151,500 hectares and the global area under coca cultivation was 159,600 hectares in 2005. It is thus comparable to the size of some of the smaller countries[17].

Global heroin production was estimated at 462 tons in 2005, and global cocaine production at 932 tons.

The decline in global opium production of 5 per cent in 2005 was due to lower levels of opium production in Afghanistan (-2 per cent), lower levels of opium production in Myanmar (-16 per cent), in Laos (-67 per cent) as well as in Latin America (-25 per cent). The declines in the area under poppy cultivation were even more impressive: twenty-three per cent in total, reflecting a decline of 21 per cent in the area under cultivation in Afghanistan, -26 per cent in Myanmar, -73 per cent in Laos and -30 per cent in Latin America. Seen in perspective, the 2005 area under global poppy cultivation (151,500 hectares) was - with the exception of 2001 - the lowest since 1987.

The overall decline in global opium production could have been far more pronounced, if yields in Afghanistan had not recovered in 2005 from their low levels a year earlier. Opium production in Afghanistan (4,100 tons) accounted for 89 per cent of global opium production in 2005. The next largest producers were Myanmar with 312 tons (6.8 per cent). Mexico and Colombia accounted for 2 per cent, Pakistan for 1.3 per cent and Laos for 0.3 per cent of global opium production.

The global area under coca cultivation amounted to 159,600 hectares by the end of 2005 and was thus largely stable as compared to a year earlier (+1 per cent). Though higher than in 2003 and 2004, the area under coca cultivation was still lower than in all years of the 1990s and lower than in the late 1980s. The area increased in Colombia in 2005 by 7.5 per cent to 86,000 hectares, but declined in Peru to 48,200 hectares (-4.2 per cent) and Bolivia to 25,400 hectares(-8.3 per cent), reversing the trends in 2004 when coca declined in Colombia and increased in Peru and Bolivia. As compared to the year 2000, the area under coca cultivation is still 47 per cent lower in Colombia, though 11 per cent higher in Peru and 74 per cent higher in Bolivia. The net result is an area under cultivation in 2005 that is still 28 per cent lower than in 2000.

Improved yields and laboratory efficiency have, however, prevented these gains from being translated into any significant decline in cocaine production. Cocaine production in 2005 was 3 per cent lower than a year earlier but was still slightly higher than in 2000 (6 per cent), though marginally lower than in 1996 (-2 per cent) and about the same as a decade earlier.

Cannabis herb production continues to increase…

There are strong indications that cannabis herb production continued increasing in 2004/05. UNODC's cannabis herb production estimates show a value of 45,000 tons in 2004/05, up from the estimate of 42,100 tons published in the 2005 *World Drug Report.* As compared to the early 1990s, cannabis herb production appears to have doubled. In contrast, to the estimates on heroin and cocaine, the estimates collected from Member States are – in most cases – not based on strict scientific criteria and must thus be treated with caution.

…while cannabis resin production appears to have declined in 2005

UNDOC's cannabis resin estimates for 2004 were 7,500 metric tons, slightly higher than those for 2002/03 (6,300 metric tons). However, there are indications that global production fell in 2005, following the massive reduction of cannabis resin production in Morocco, the world's largest cannabis resin producer. Cannabis resin production, derived from remote sensing studies and ground surveys in Morocco, declined from 3,070 metric tons in 2003 and 2,760 metric tons in 2004 to 1,070 metric tons in 2005, a decline of more

17 The global area under opium or coca cultivation is larger than the size of countries or areas such as Saint Kitts and Nevis (26,900 ha), Maldives (29,800 ha), Malta (31,560 ha), Grenada (34,450 ha), Saint Vincent and the Grenadines (38,930 ha), Barbados (43,000 ha).

than 60 per cent in 2005. There are not, as yet, sufficient data available for UNODC to provide an overall production estimate for 2005, but the strong decline in Morocco should have been sufficient to reduce global cannabis resin production in 2005.

ATS production has been contained in recent years, but is still higher than in the late 1990s

UNODC has estimated volumes of ATS production for the years 1997-99, 2000-2001 and 2003 and 2004. The estimates, showed a rapidly rising production for the late 1990s (from 246 to 410 metric tons for the amphetamines and 49 to 113 tons for ecstasy). In subsequent years, however, production declined to 332 metric tons of amphetamines and 90 metric tons of ecstasy. For 2004 amphetamines production was estimated at 354 metric tons and ecstasy production at 126 metric tons. Given large margins of error in these estimates, the conclusion is likely to be that overall ATS production remained more or less stable in 2004, though production was higher than in the late 1990s.

1.2 The outlook for world drug markets

Opium/heroin market

Developments in Afghanistan will shape the situation on the opium/heroin market

For the first time since 2002, global opium poppy production decreased, largely due to a significant drop in the area under opium poppy cultivation in Afghanistan. Nevertheless, with Afghanistan holding the overwhelming share of global opium production (89 per ent in 2005), developments in that country will continue to shape the situation on the world opium/heroin market.

Unfortunately, early indications are that the achievements of 2005 will not be repeated in 2006. Findings from the UNODC Afghanistan Opium Rapid Assessment Survey show that planting of opium poppy has risen. Strong increases are foreseen for seven provinces. This includes the province of Helmand, which already had the highest levels of opium poppy cultivation in the country. In 2005, a quarter of the area under opium poppy cultivation was located in Helmand alone. If counted separately, Helmand province would be the third largest opium poppy cultivator in the world, after Myanmar. The strong increases in the levels of cultivation in Helmand province are said to be induced by drug traffickers who encourage villagers to grow opium poppy. Helmand is also the most significant province in terms of heroin manufacture and trafficking. There is a clear threat that drug trafficking will continue to permeate the province and that this could potentially endanger the stability of Afghanistan.

Declines in opium production have been achieved in the two major opium producing countries of South-East Asia: Myanmar and Lao People's Democratic Republic (Lao PDR). Achievements are even more impressive when the long-term trend is examined: Since 1998, the area under opium poppy cultivation in both countries has been reduced from 157,100 hectares to 34,600 hectares, a decline of 78 per cent. In 2005, both countries only accounted for seven per cent of global opium production, compared to one-third of global opium production in 1998. At the beginning of the 1990s, Myanmar rivalled Afghanistan as leading opium producer in the world. If these declines can be sustained, and this appears to be the case, South-East Asia could disappear from the global illicit opium production map in the not too distant future. Heroin of South-East Asian origin has already become very rare in European drug markets and has lost its once dominant position in North America.

A reduction in opium poppy production was also observed in Latin America. In Colombia, the area under opium poppy cultivation was cut in half, from 4,000 in 2004 to 2,000 hectares in 2005. This will affect the availability of heroin in the illicit markets of North America. There is, of course, a danger that some of the possible shortfall of heroin will be compensated with heroin from Afghanistan.

Increasing amounts of heroin will be trafficked through West and Central Asia, stretching law enforcement authorities to the limits

Increasing availability of opium and heroin will increase trafficking from Afghanistan to opiates markets in West and Central Asia and Europe. Shifts in the production centres in Afghanistan have already altered trafficking routes, with more opiates leaving Afghanistan towards Iran and less being trafficked towards Pakistan and Central Asian countries. However, as cultivation and production levels in Badakshan, the north-eastern province in Afghanistan, and the starting point of the Central Asian opiate trafficking route, are expected to increase, this trend could change again.

Opiate abuse could rise in the countries along the main trafficking route

While the annual prevalence estimate for opiates shows a globally stable level of opiate abuse, strong increases are shown in some countries that lie along the main trafficking routes of opiates. The number of opiate users in Iran, already estimated to be above one million, could further increase. Similarly, this may affect abuse levels in the Russian Federation and other CIS countries, which already seem to have high levels of opiate abuse.

Coca/cocaine market

Containment of the cocaine market defined by stable production levels and increasing interception rates

The area under coca cultivation and production of cocaine remained essentially stable in 2005. The area under cultivation is 28 per cent less than in 2000 and 26 per cent less than a decade ago. Cocaine production, however, has failed to decline due to better yields and improved know-how in cocaine processing. Production remained practically unchanged from the levels a decade ago. The past years have also seen record levels of cocaine interception. Global seizures of cocaine rose to a record high in 2004 and indications are that this trend continued in 2005 and possibly 2006.

In 2004, 84 per cent of all cocaine seizures were made in the Americas. The world's highest seizures were made by Colombia. Strong increases were also reported from North America where the level of seizures increased by 41 per cent from 2003 to 2004. Possibly as a result of the interdiction, cocaine purity levels have declined.

A continuous rise in cocaine seizures made in Europe over the past five years also indicates that trafficking organizations increasingly target the European market. In some cases, however, cocaine is already stopped in the Western Hemisphere, as indicated by the fact that 42 per cent of Dutch cocaine seizures are made in the waters off the cost of Netherlands Antilles.

Cocaine for Europe is increasingly transshipped through Africa

For some time, cocaine has transited Africa en route to Europe. In its report for 2005, the International Narcotics Control Board notes that drug trafficking organizations are increasingly using West African countries for cocaine trafficking. Seizure levels have confirmed this trend. Cocaine seizures in Africa increased to more than 3 tons in 2004 and far higher levels are regularly seized by European law enforcement agencies off the coasts of Cape Verde, Senegal and Mauritania. In contrast to 1997 and 2001, when cocaine seizures in Africa were at an even higher level and dropped sharply in subsequent years, the current development is likely to become more permanent as there is some anecdotal evidence that some cocaine trafficking organizations have shifted their operations to African countries to run their trade from there. Cocaine trafficking in that region will therefore, in all likelihood, increase.

Global prevalence of cocaine expected to be stable but situation in largest markets varies

No major changes were noted in the global cocaine market, with prevalence levels remaining at almost the same levels. The United States market appears stable or declining. European countries report a general upward trend of cocaine use and this may well continue for some time as cocaine use levels are still lower in Europe than in North America and its image among the general population is still not very negative in Europe. The transhipment of cocaine is also likely to have spillover effects in the African countries affected by this sort of trafficking.

Cannabis

Cannabis continues to be the largest drug market in the world; production increases foreseen for cannabis herb

The cannabis market consists of two different markets: the market for cannabis herb, which is the largest drug market in the world, and the market for cannabis resin. The number of countries in which cannabis is cultivated continued to increase. UNODC estimates that cannabis herb is cultivated in some 176 countries in the world. Unlike opium and coca, for which relatively reliable production data can be obtained, estimates on cannabis production are often based on perception and scientifically valid monitoring systems are the exception.

Nevertheless, there are indications that the level of cannabis herb production will continue to increase. Cultivation of cannabis is traditionally easy as the plant can grow in virtually every inhabited region in the world. Furthermore, over the years, special strains have been cultivated which can be grown indoors and hydroponically. With cannabis seeds and growing paraphernalia available in grow shops in several developed countries and also on the Internet, it has been easier to procure cannabis and there is no indication that cannabis users have not utilized these opportunities.

… whereas global production for cannabis resin is expected to decline, due to lower production in Morocco

Cannabis resin production on the other hand, appears to be in decline, at least for 2005. The Government of Morocco has been carrying out cannabis cultivation sur-

veys, in cooperation with UNODC, and results from the 2005 survey show that cannabis resin production fell for the second consecutive year in 2005, to about 1,070 metric tons (-61 per cent). As Morocco is a major source of cannabis resin seized in Europe, the largest cannabis resin market in the world, the lower availability of cannabis resin is expected to be felt in the cannabis resin market in Europe. Cannabis users in that region may increasingly turn to herbal cannabis the availability of which has been increasing over the years.

Cannabis use will continue to increase as will the demand for treatment in cannabis use

Cannabis use has continued growing. The annual prevalence estimate published in the 2004 World Drug Report (referring to 2001) was 146 million of cannabis users who have used the drug at least once during the past 12 months. This figure was raised to 162 million for 2004/05. While direct comparisons of these estimates must be treated with caution as they also reflect improved data availability, the magnitude and other indicators suggest that cannabis use continues to expand. As treatment demand for cannabis use has risen, there are also indications that the effects of the drug are more harmful than believed so far, possibly reflecting, *inter alia,* the emergence of higher potency cannabis on the markets.

Amphetamine-type stimulants (ATS)

Global production of amphetamine-type stimulants may well increase

Traditionally, methamphetamine has been the largest of the ATS markets with production centres in Asia and North America. The latest developments are that manufacturing and trafficking of methamphetamine has spread beyond these two traditional regions. Increases have been reported, *inter alia*, from South Africa. Use of methamphetamine has increased in some parts of Asia and this trend is likely to continue. In the United States, use of methamphetamine has shown a westward expansion over the last decade, and it is expected that this trend will continue. General population surveys have not, as yet, shown an increase but this may change in the future. Treatment episode data from the United States continue to show an upward trend. The European methamphetamine problem has been very limited in scope and has, so far, only affected a few countries. While itt is too early to identify a general upward trend of methamphetamine abuse in Europe, past experience has shown that drug trends observed in the United States (cannabis, cocaine) have also affected the European drug markets with some delay.

Amphetamine is rising again in Europe

More amphetamine-producing laboratories were detected in 2004 than in 2003, most of them in Europe. Use of amphetamine appears to be stable in the United Kingdom, where annual prevalence of amphetamine has fallen steadily over the past five years. Increased production and use levels, however, have been reported from Germany and some Central European countries. There is a likelihood that this upward trend will continue.

At the global level, ecstasy will gain in importance in developing countries

After considerable increases, ecstasy appears to have lost momentum in some parts of the world. This can be attributed to the decisive action that some countries have taken against the drug. In the United States, ecstasy use among young people has shown a steadily downward trend in recent years. In Europe, the main production centre of ecstasy, use has surpassed that of amphetamines and in some countries, prevalence of ecstasy among young adults is higher than in the United States. There are signs that in countries where ecstasy use is already high, the market is stagnating while it is still going to increase in countries with lower levels of ecstasy prevalence. This also applies to developing countries, notably in East and South-East Asia where there seems to be the largest potential of expansion of the ecstasy market. Increases in treatment demand have already been reported. There is no sign that this trend will abate in the near future. Ecstasy use, in the developed countries as a whole, can be expected to remain stable.

1.3 Opium / Heroin market

1.3.1 Production

Estimated area under illicit opium poppy cultivation decreases by 22 per cent

In 2005, the estimated area under illicit opium poppy cultivation in the world decreased by 22 per cent, due to less cultivation in the three main source countries of illicit opium in the world: Afghanistan, Myanmar and Lao People's Democratic Republic (Lao PDR).

This was particularly noteworthy, as in Afghanistan, in 2005, opium poppy cultivation decreased for the first time after three consecutive years of increases. The area under opium poppy cultivation in Afghanistan decreased by 21 per cent from about 131,000 hectares in 2004 to a level of 104,000 hectares in 2005. Opium poppy cultivation decreased in 19 provinces in 2005. The largest declines - in absolute terms - were found in Nangarhar (27,120 hectares), Badakshan (8,237 hectares) and in Uruzgan (6,475 hectares). There is considerable diversity in opium poppy cultivation in Afghanistan. While opium poppy cultivation in Central Afghanistan almost disappeared in 2005, declining from 4,600 hectares in 2004 to a mere 106 hectares in 2005, increases of more than 10 per cent were seen in 10 provinces. Altogether, five provinces (in order of magnitude: Helmand, Kandahar, Balkh, Farah and Badakshan) accounted for 65 per cent of the total area under opium poppy cultivation in 2005.

Sustained progress has been made by the Governments of Myanmar and Lao PDR in addressing the issue of illicit opium poppy cultivation. In 2005, Myanmar achieved a further reduction of the total area under opium poppy cultivation, by 26 per cent to 32,800 hectares. In Lao PDR, cultivation even dropped by a staggering 72 per cent, to 1,800 hectares. Since 1998, the year of the Twentieth Special Session of the General Assembly on countering the World Drug Problem together, opium poppy cultivation in these two South-East Asia countries has been reduced by 78 per cent.

In the Americas, opium poppy continues to be cultivated for use in the illicit markets in North America. In Colombia, opium poppy cultivation was introduced in the 1980s when coffee prices declined. Estimates by the Government of Colombia put the area under opium poppy cultivation at about 2,000 hectares, a reduction of 50 per cent compared to the 4,000 hectares recorded in 2004. The Government of the United States estimates that, in 2005, 3,300 hectares were devoted to opium poppy cultivation in Mexico. (The Government of Mexico did not provide any cultivation data to UNODC at the time of producing the present report.) The situation as regards opium poppy cultivation in Peru is difficult to quantify as the UNODC supported national illicit crop monitoring system has not yet established a reliable methodology for the detection of opium poppy in Peru. Colombia, Mexico and Peru all continue to eradicate opium poppy cultivation.

Low levels of opium poppy cultivation continue to exist in many regions and countries such as the Caucasus region, Russian Federation, Thailand, Ukraine and Viet Nam.

… but global opium production declines by only 5 per cent

Despite the decrease in the area under opium poppy cultivation, global opium production decreased by only 5 per cent to 4,620 metric tons in 2005. In Afghanistan, potential opium production was estimated at around 4,100 metric tons, representing a 2.4 per cent decrease compared to 2004. The clear discrepancy between the large decrease in cultivation and the relatively small decrease in production was primarily due to more favourable weather conditions during the growing season. In Afghanistan, the opium yield in 2005 was estimated at 39 kg/ha, an increase of 22 per cent compared to the 2004 yield figure of 32 kg/ha.

Higher yields were also reported from Myanmar. In Shan State, where ninety per cent of the total opium poppy cultivation in Myanmar takes place, yields ranged from 5.4 kg in East Shan State to 13.4 kg in South Shan State, where additional rain and improved cultivation practices resulted in significantly higher yields.

Opium prices mirror the supply situation

In Afghanistan, overall prices for fresh opium at harvest time remained essentially stable at around US$100/kg in 2005. However, regional price differences are pronounced and mirror the supply situation throughout the country. While low prices in northern Afghanistan reflect strong production increases in that area, the highest prices can be found in central Afghanistan where cultivation practically ceased in 2005. In Myanmar, the average farm gate price of opium at harvest time was estimated at US$ 187/kg which represents an increase of 22 per cent compared to 2004. In Lao PDR, the average farm gate price of opium increased by 139 per cent to US$ 521, reflecting the scarcity of opium produced in a country that is on the verge of becoming opium poppy free.

Most opium processing laboratories dismantled in Russia, Moldova and Afghanistan

In 2004, 11 countries reported the destruction of opium processing laboratories involved in the illicit manufacture of products of the opium/heroin group in 2004 with a total of 787 sites destroyed. Most laboratories were reported destroyed by the Russian Federation (57 per cent), followed by Republic of Moldova (24 per cent), and Afghanistan (16 per cent). Laboratories in the Republic of Moldova mostly produced acetylated opium, whereas laboratories destroyed in Afghanistan and the Russian Federation mainly produced heroin and opium, respectively. Smaller numbers of destroyed laboratories were reported by Colombia (9), Australia (5), India (3), Myanmar (2), Belarus, Hong Kong Special Administrative Region of China, Mexico and Turkey (all 1 each).

Continuous decline of reported heroin processing laboratories in Turkey

Over the last couple of years, the number of destroyed laboratories belonging to the opium/heroin group has shown strong fluctuations without indicating a clear trend. Comparisons over several years, however, show the declining number of heroin processing laboratories dismantled in Turkey, which was once considered one of the main heroin processing locations. Only one heroin processing laboratory was reported dismantled in 2004, down from 10 in 2002 and 14 in 1997. This appears to support information that opium is increasingly being processed into morphine and heroin in Afghanistan. While in 1992/93, 56 per cent of the morphine and heroin seizures of Turkey consisted of morphine, this proportion fell to 35 per cent over the 2000-2004 period and to just 2 per cent in 2005, also suggesting that there has been a downward trend in heroin manufacture in Turkey, while heroin manufacture in Afghanistan has increased.

OPIUM

Table 4. GLOBAL ILLICIT CULTIVATION OF OPIUM POPPY AND PRODUCTION OF OPIUM, 1990-2005

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CULTIVATION[a] IN HECTARES																
SOUTH-WEST ASIA																
Afghanistan	41,300	50,800	49,300	58,300	71,470	53,759	56,824	58,416	63,674	90,583	82,171	7,606	74,100	80,000	131,000	104,000
Pakistan	7,488	7,962	9,493	7,329	5,759	5,091	873	874	950	284	260	213	622	2,500	1,500	2,400
Subtotal	48,788	58,762	58,793	65,629	77,229	58,850	57,697	59,290	64,624	90,867	82,431	7,819	74,722	82,500	132,500	106,400
SOUTH-EAST ASIA																
Lao PDR	30,580	29,625	19,190	26,040	18,520	19,650	21,601	24,082	26,837	22,543	19,052	17,255	14,000	12,000	6,600	1,800
Myanmar	150,100	160,000	153,700	165,800	146,600	154,070	163,000	155,150	130,300	89,500	108,700	105,000	81,400	62,200	44,200	32,800
Thailand [b]	1,782	3,727	3,016	998	478	168	368	352	716	702	890	820	750			
Viet Nam [b]	18,000	17,000	12,199	4,268	3,066	1,880	1,743	340	442	442						
Subtotal	200,462	210,352	188,105	197,106	168,664	175,768	186,712	179,924	158,295	113,187	128,642	123,075	96,150	74,200	50,800	34,600
LATIN AMERICA																
Colombia [c]		1,160	6,578	5,008	15,091	5,226	4,916	6,584	7,350	6,500	6,500	4,300	4,100	4,100	3,950	2,000
Mexico [d]	5,450	3,765	3,310	3,960	5,795	5,050	5,100	4,000	5,500	3,600	1,900	4,400	2,700	4,800	3,500	3,300
Subtotal	5,450	4,925	9,888	8,968	20,886	10,276	10,016	10,584	12,850	10,100	8,400	8,700	6,800	8,900	7,450	5,300
OTHER																
Combined [e]	8,054	7,521	2,900	5,704	5,700	5,025	3,190	2,050	2,050	2,050	2,479	2,500	2,500	3,000	5,190	5,200
GRAND TOTAL	**262,754**	**281,560**	**259,686**	**277,407**	**272,479**	**249,919**	**257,615**	**251,848**	**237,819**	**216,204**	**221,952**	**142,094**	**180,172**	**168,600**	**195,940**	**151,500**
POTENTIAL PRODUCTION IN METRIC TONS OPIUM[f]																
SOUTH-WEST ASIA																
Afghanistan	1,570	1,980	1,970	2,330	3,416	2,335	2,248	2,804	2,693	4,565	3,276	185	3,400	3,600	4,200	4,100
Pakistan	150	160	181	161	128	112	24	24	26	9	8	5	5	52	40	61
Subtotal	1,720	2,140	2,151	2,491	3,544	2,447	2,272	2,828	2,719	4,574	3,284	190	3,405	3,652	4,240	4,161
SOUTH-EAST ASIA																
Lao PDR	202	196	127	169	120	128	140	147	124	124	167	134	112	120	43	14
Myanmar	1,621	1,728	1,660	1,791	1,583	1,664	1,760	1,676	1,303	895	1,087	1,097	828	810	370	312
Thailand [b]	20	23	14	17	3	2	5	4	8	8	6	6	9			
Viet Nam [b]	90	85	61	21	15	9	9	2	2	2						
Subtotal	1,933	2,032	1,862	1,998	1,721	1,803	1,914	1,829	1,437	1,029	1,260	1,237	949	930	413	326
LATIN AMERICA																
Colombia [c]		16	90	68	205	71	67	90	100	88	88	80	76	76	56	28
Mexico [d]	62	41	40	49	60	53	54	46	60	43	21	71	47	-	73	69
Subtotal	62	57	130	117	265	124	121	136	160	131	109	151	123	76	129	97
OTHER																
Combined [e]	45	45	-	4	90	78	48	30	30	30	38	18	14	4	68	36
GRAND TOTAL	**3,760**	**4,274**	**4,143**	**4,610**	**5,620**	**4,452**	**4,355**	**4,823**	**4,346**	**5,764**	**4,691**	**1,596**	**4,491**	**4,662**	**4,850**	**4,620**
HEROIN																
Potential HEROIN	**376**	**427**	**414**	**461**	**562**	**445**	**436**	**482**	**435**	**576**	**469**	**160**	**449**	**466**	**495[g]**	**472[g]**

(a) Opium poppy harvestable after eradication.
(b) Due to small production, cultivation and production were included in the category " Other countries", for Viet Nam as of 2000 and for Thailand as of 2003.
(c) According to the Government of Colombia, cultivation covered 7,350 hectares and 6,500 hectares and production amounted to 73 mt and 65 mt in 1998 and 1999 respectively.
(d) As its survey system is under development, the Government of Mexico indicates that it can neither provide cultivation estimates nor endorse those published by UNODC, which are derived from US Government surveys.
(e) Includes countries such as Russia, Ukraine, Central Asia, Caucasus region, other C.I.S. countries, Baltic countries, Guatemala, Peru, Viet Nam (as of 2000), Thailand (as of 2003), India, Egypt and Lebanon.
(f) All figures refer to dry opium.
(g) Heroin estimates are based on the Afghanistan Opium Survey (430 mt in 2004 and 420 mt in 2005). For other countries, a 10:1 ratio is used for conversion from opium to heroin.

Fig. 18: Global opium poppy cultivation 1990-2005 (ha)

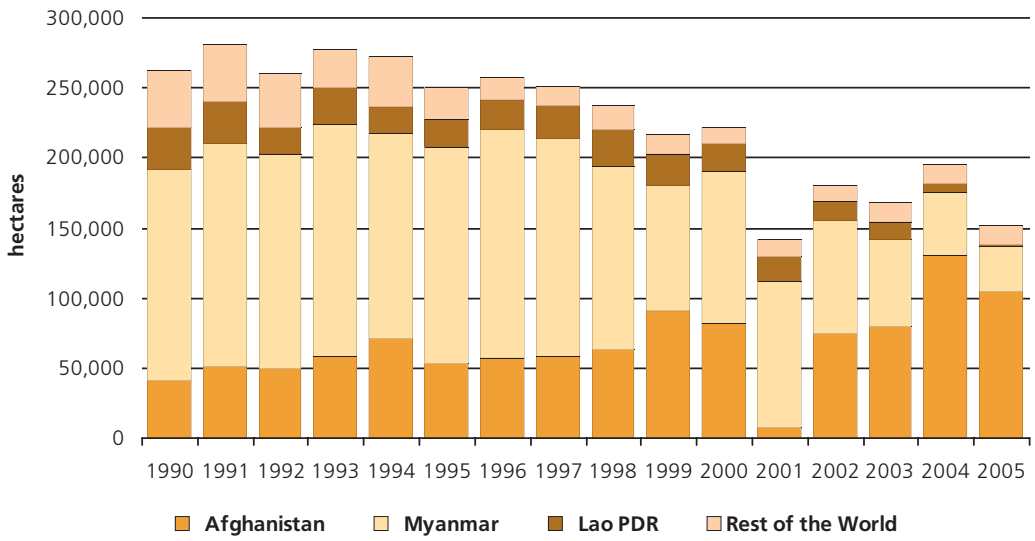
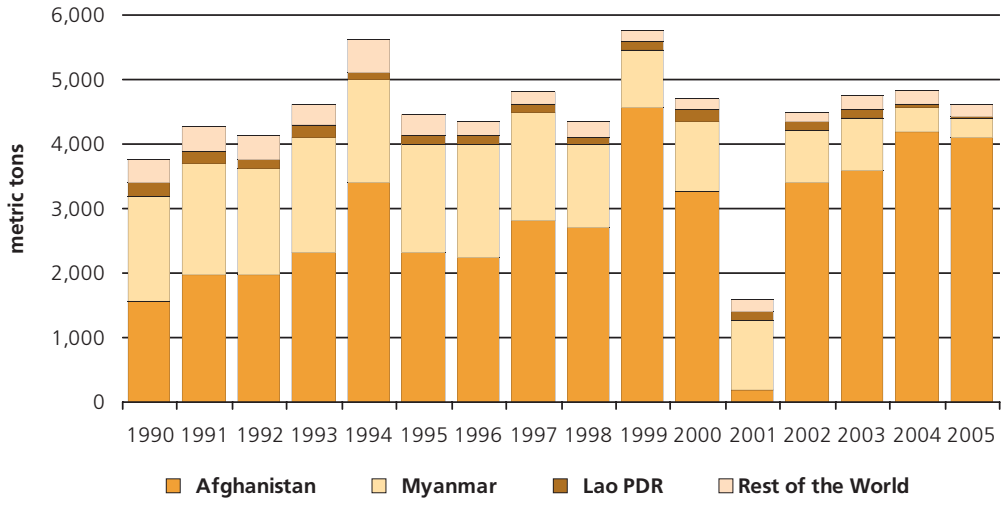
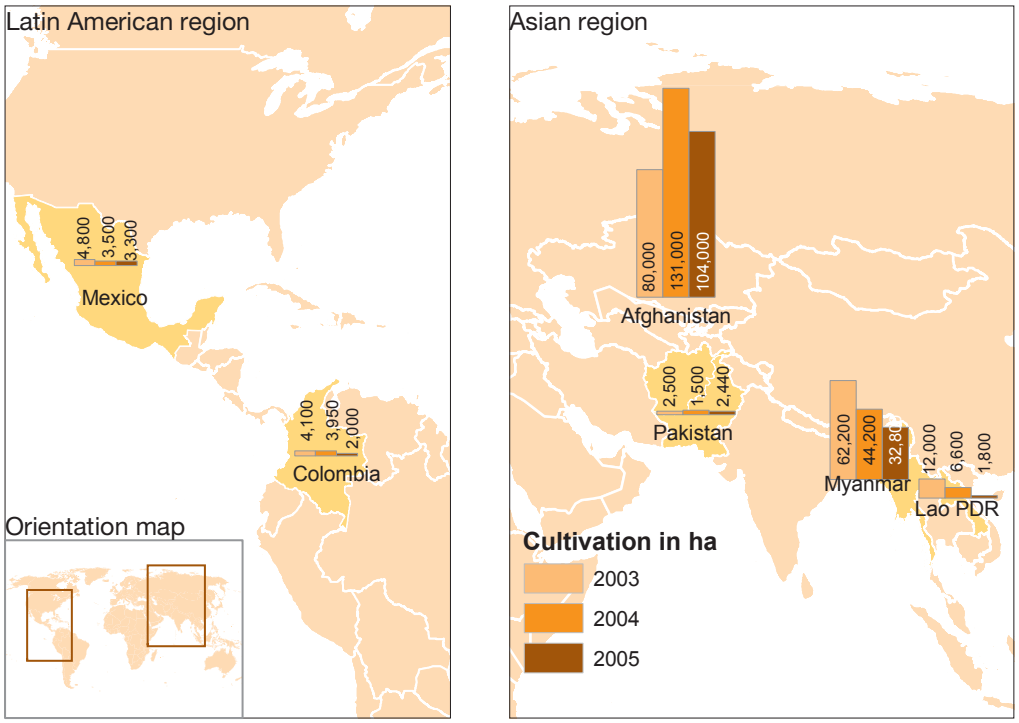


Fig. 19: Global opium production 1990-2005 (metric tons)



Map 2. Opium poppy cultivation (2003 - 2005)



Map 3. Opium production (2003 - 2005)

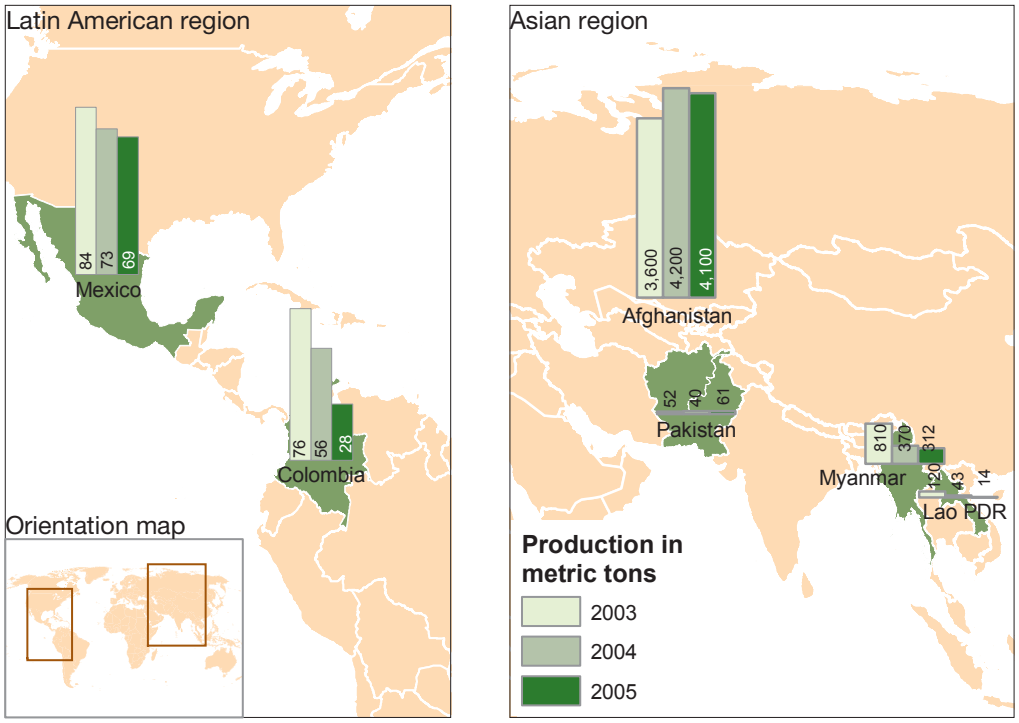


Fig. 20:
Annual opium poppy cultivation and opium production in main producing countries, 1990 - 2005

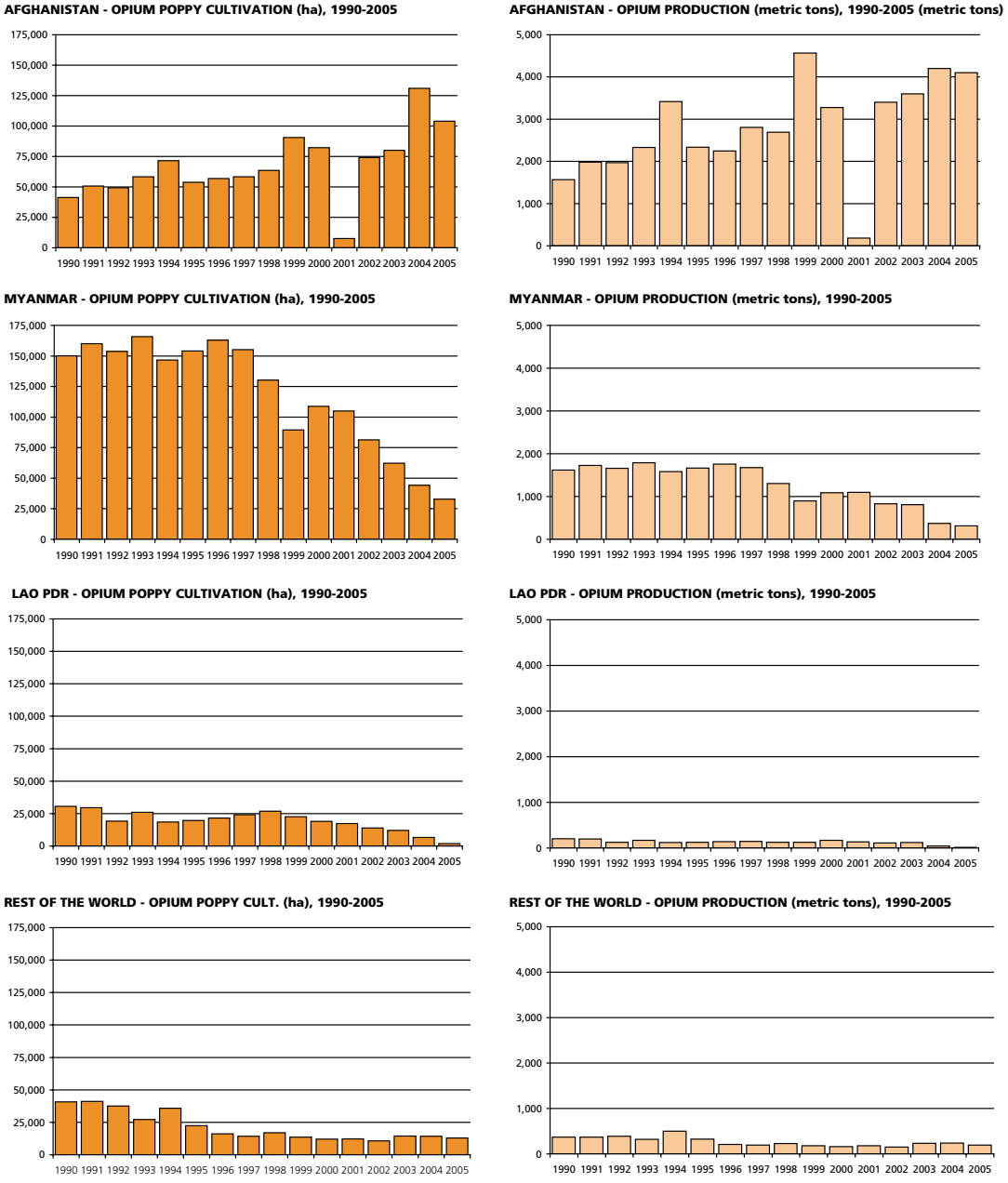


Fig. 21: Opium poppy cultivation

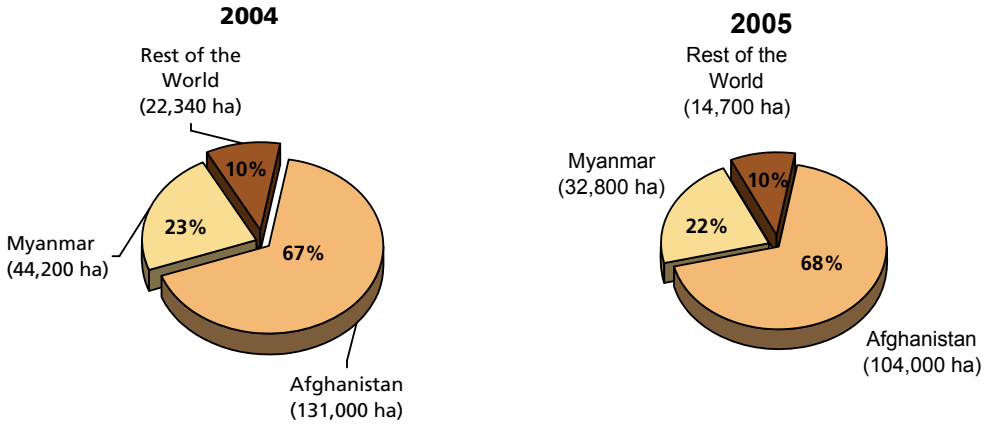
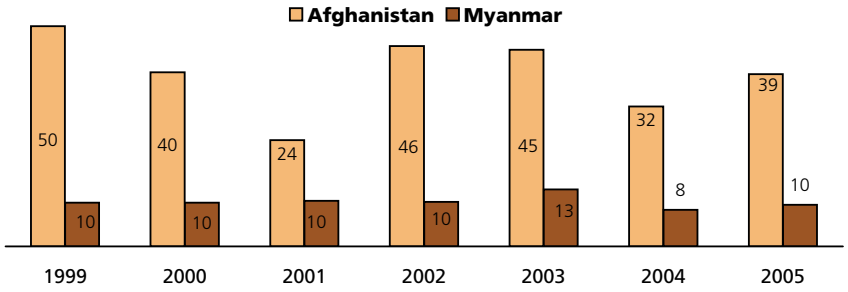


Fig. 22: Opium yields in Afghanistan and Myanmar (kg/ha), 1999-2005



Differences in opium yield between Afghanistan and Myanmar are due to differences in opium poppy varieties and growing conditions. Variations of yields from year to year in the same country are mostly caused by changes in weather conditions and/or, as in the case of Afghanistan in 2001, by a shift in the relative distribution of cultivation from irrigated to rain-fed land.

Fig. 23: Opium production

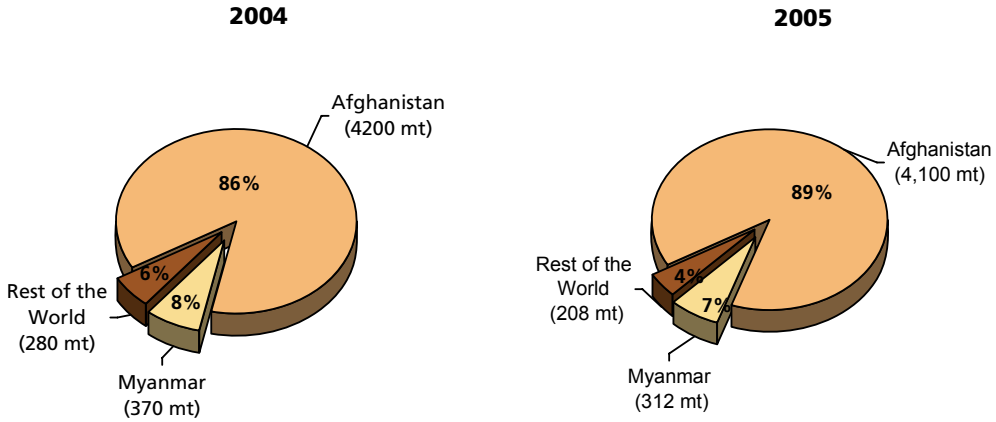


Table 5. Significant opium poppy eradication reported (ha), 1995-2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Afghanistan					400	121			21,430		5,103
Colombia	5,074	7,412	7,333	3,077	8,434	9,279	2,583	3,371	2,994	3,865	2,108
Egypt										65	
Lao PDR									4,134	3,556	2,575
Mexico	15,389	14,671	17,732	17,449	15,461	15,717	15,350	19,157	20,034	15,926	20,803
Myanmar	3,310	1,938	3,093	3,172	9,824	1,643	9,317	7,469	638	2,820	3,907
Pakistan		867	654	2,194	1,197	1,704	1,484		4,185	5,200	707
Peru				4	18	26	155	14	57	98	92
Thailand	580	886	1,053	716	808	757	832	507	767	122	110
Venezuela										87	154
Vietnam	477	1,142	340	439		426				32	

1.3.2 Trafficking

Opiates are trafficked along three major routes …

There are currently three distinct production centres for opiates which supply three distinct markets. Trafficking flows are as follows:

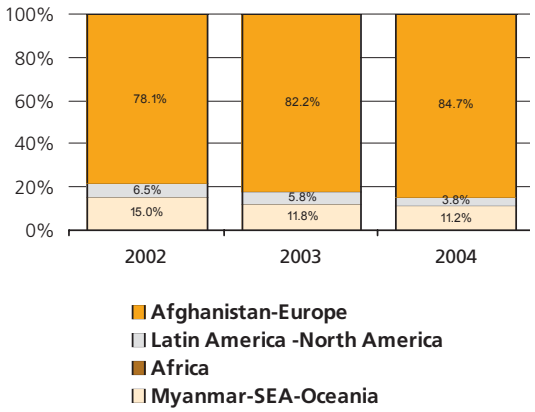
- from Afghanistan to neighbouring countries, the Middle East and Europe;
- from Myanmar/Laos to neighbouring countries of South-East Asia, (notably China) and to the Oceania region (mainly Australia);
- from Latin America (Mexico, Colombia and Peru) to North America (notably USA)

The bulk of global opiate seizures (heroin, morphine and opium, expressed in heroin equivalents[18]) takes place in the countries surrounding Afghanistan (South-West Asia, South and Central Asia: 60 per cent of global seizures in 2004). Including Europe, such seizures amounted to almost 85 per cent of the global total. Remaining opiate seizures are made in East & South-East Asia and Oceania, accounting for 11 per cent of the global total; the Americas (4 per cent of the global total)and Africa (0.3 per cent). Africa is supplied from both South-West Asia and South-East Asia.

… with most seizures being made along the Afghanistan-Europe trafficking route.

Between 2002 and 2004, the proportion of opiate seizures along the Afghanistan–Europe trafficking route increased from 78 per cent to 85 per cent, reflecting rising levels of opium production in Afghanistan and thus rising levels of opiate trafficking from Afghanistan. The volume of opiate seizures along the other two main routes showed a downward trend (from 7 per cent to 4 per cent in the Americas, and from 15 to 11 per cent for the South-East Asia/Oceania route). These declines in the proportions in total opiate seizures in the latter two markets are in line with reports of actual declines of production in South-East Asia and in Latin America.

Fig. 24: Distribution of opiate seizures (expressed in heroin equivalents[18]), 2002-2004



Source: UNODC, Annual Reports questionnaire Data/DELTA.

While there is some opiate trafficking from South-East Asia to North America and to Europe and from South-West Asia to South-East Asia (notably China) and to North America, the amounts trafficked across the various markets tend to be rather small.

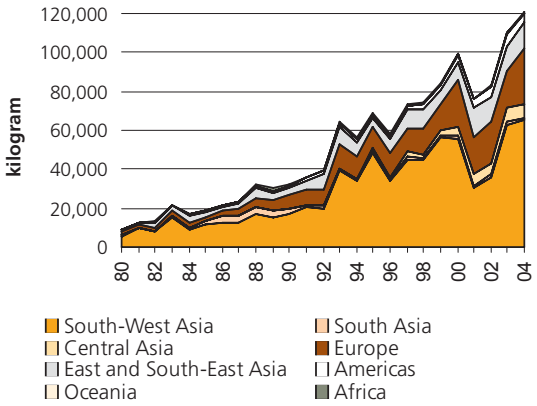
Global seizures of opiates continue to increase …

Global seizures of opiates (heroin, morphine and opium, expressed in heroin equivalents) reached 120 metric tons in 2004, an increase of 9 per cent as compared to the previous year. Following a decline of opium and morphine seizures in 2001, the year of the opium poppy cultivation ban in Afghanistan, and of heroin in 2002 (mainly reflecting a delay of about a year in the production of opium in Afghanistan and the arrival of heroin in the West European markets), opiate seizures grew again strongly in subsequent years. Global opiate seizures in 2004 were 21 per cent higher than in 2000. Over the 1994-2004 period opiate seizures grew, on average, by 8 per cent per year.

[18] Opium, morphine and heroin, expressed in heroin equivalents using a 10 : 1 ratio for opium to heroin (i.e. 10 kg opium for the manufacture of 1 kg of heroin) and a 1:1 conversion rate for morphine to heroin.

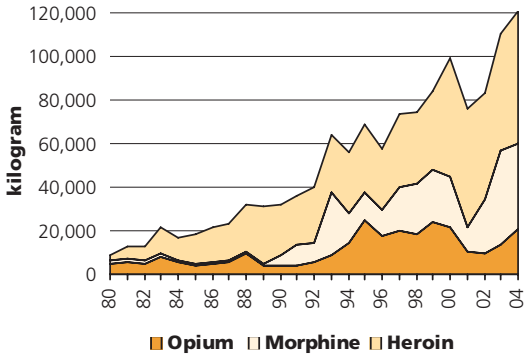
The increases in opiate seizures in 2003 had been particularly pronounced in South-West Asia (+75 per cent) and Central Asia (+33 per cent), i.e. in the countries surrounding Afghanistan, reflecting the large scale resumption of opium production in Afghanistan in 2002 and 2003. In 2004, increases in opiate seizures were particularly strong in South-East Europe (Turkey and the Balkan countries: +109 per cent) reflecting the resumption of large-scale trafficking along the Balkan route.

Fig. 25: Global opiate seizures, expressed in heroin equivalents, regional breakdown, 1980-2004



Source: UNODC, Annual Reports questionnaire Data/DELTA.

Fig. 26: Global opiate seizures, expressed in heroin equivalents, by substance, 1980-2004



Source: UNODC, Annual Reports questionnaire Data/DELTA.

… and exceed the rise in global opium production

If opium, heroin and morphine seizures for 2004 are transformed into opium equivalents, opiate interception ratios for Afghanistan are equivalent to 1.1 per cent of domestic opium production. They rise to 15.5 per cent if seizures of South-West Asia are considered and to 17 per cent if seizures of Central Asia are included as well. At the global level, an estimated 25 per cent of globally produced opiates were seized in 2004, up from 23 per cent in 2003 and just 10 per cent in 1994, indicating that global enforcement efforts improved over the last decade.

Significant increase of global opium seizures in 2004 …

Opium seizures increased by 57 per cent to 210 metric tons in 2004 and are thus approaching the peak levels of 1999 and 2000 (the years prior to the 2001 opium ban in Afghanistan), reflecting – *inter alia* – increases of opium production in Afghanistan.

The large majority of opium (94 per cent) continues to be seized in South-West Asia. Seizures in this subregion increased by 77 per cent in 2004. The increase in opium seizures outpaced the increase in opium production in Afghanistan, which amounted to 17 per cent in 2004.

Most opium continues to be seized in the Islamic Republic of Iran, which in 2004, with seizures of 35 metric tons, accounted for 83 per cent of all opium seizures in the world. Compared to 2003, opium seizures in Iran increased by 34 per cent in 2004. The level of opium seizures in Afghanistan also increased strongly, from 8.4 metric tons in 2003 to 21.5 metric tons in 2004, thus approaching the seizures reported from Pakistan (25 metric tons).

… and seizures of heroin and morphine reaching a new record high

Global heroin seizures rose by 13 per cent in 2004 while morphine seizures declined by 10 per cent, reflecting a trend towards trafficking the end-product rather than the intermediary product. Heroin and morphine seizures together rose by 3 per cent to close to 100 metric tons in 2004, a new record high.

Seizures of heroin and morphine more than doubled in Afghanistan, from 0.9 metric tons in 2003 to 2.5 metric tons in 2004, reflecting strengthened law enforcement capacity. For South-West Asia as a whole, heroin and

morphine seizures amounted to 45 tons, with the bulk seized in Pakistan (25 tons) and in Iran (18 tons). Seizures in Central Asia amounted to 6 metric tons in 2004.

The shift in opium production centres in Afghanistan affected the way opium and heroin was trafficked to neighbouring countries. Already in 2004, it was observed that seizures in Pakistan and in the Central Asian countries bordering Afghanistan fell, while seizures in Iran rose, indicating a possible shift in long-established trafficking patterns. This development continued and became even more pronounced in 2005.

Decreasing opium production in Badakshan (north-eastern Afghanistan) affected the level of trafficking to countries in Central Asia (19 per cent, down from 24 per cent of the opiates leaving Afghanistan in 2004). Most of the opiates trafficked via Central Asia are destined for the Russian Federation, with only some 15 per cent being trafficked onwards to other illicit drug markets in Europe.

Declining opium production in eastern Afghanistan also reduced the amounts of opiates trafficked towards Pakistan. In 2004, about 20 per cent of all opiates are estimated to have left Afghanistan via Pakistan, down from 37 per cent a year earlier. Strengthened controls along the Afghanistan/Pakistan border also appear to have contributed to the decline. On the other hand, opiate trafficking towards Iran continued to increase (close to 60 per cent, up from 40 per cent of the opiates leaving Afghanistan in 2004). While these results for 2005 may have been exceptional, ongoing production increases of opium in southern Afghanistan in 2006[23] are likely to put an additional burden on law enforcement authorities of Iran in their efforts to prevent the trafficking of Afghan opiates to and through their country.

Strong increases of opiate seizures in Europe…

Europe's opiate seizure rose by 49 per cent in 2004 and reached almost 29 metric tons (in heroin equivalents), the highest such figure ever recorded.

While most of the opiates for the C.I.S. countries and some of the opiates for the Nordic countries are trafficked via Central Asia, most of the opiates for Western Europe are trafficked from Afghanistan to Turkey and then along various branches of the Balkan route. More than 90 per cent of opiates in Europe originate in Afghanistan.

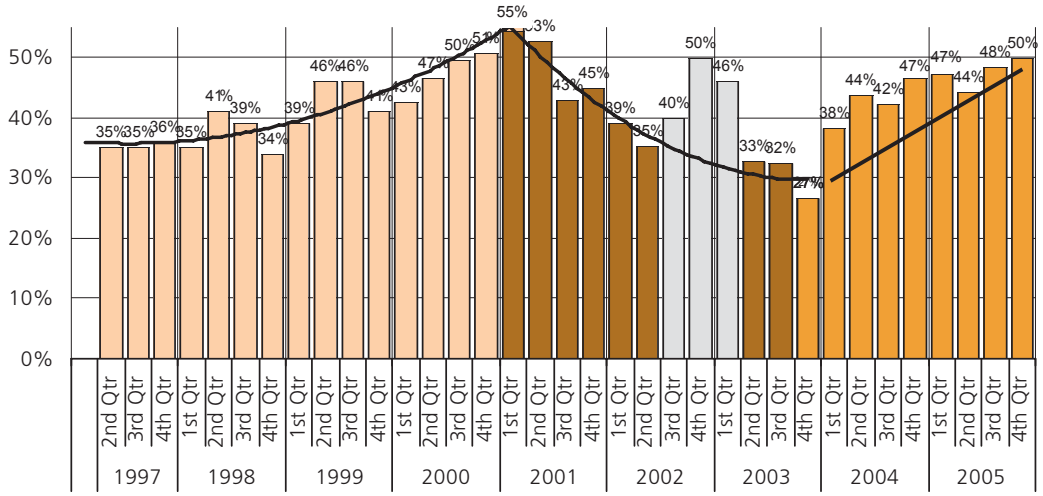
The largest amounts of opiates over the last decade were trafficked from Turkey via Bulgaria, Romania and Hungary to Slovakia, the Czech Republic, Germany and the Netherlands, or via Hungary and/or Slovakia to Austria and then to Germany and the Netherlands. In addition, a southern branch developed as of 1999/2000, with heroin smuggled from Turkey via Bulgaria and the former Yugoslav Republic of Macedonia (FYROM) to Albania, Italy, Austria and Germany. Since 2003/04, the traditional Balkan route from Turkey via Bulgaria, FYROM, Serbia & Montenegro, Bosnia Herzegovina, Croatia, Slovenia, Austria, Germany and the Netherlands has re-emerged and gained in importance, while trafficking via the more eastern Balkan route (Hungary) has lost in importance. In addition, trucks transported on ferries from Turkey to Albania, Croatia, Slovenia and northern Italy (Trieste) are frequently used to traffic opiates to Western Europe, often transiting Austria and Germany. The German Federal Criminal Police Office reports that in 2004, 45 per cent of all German heroin seizures took place close to the Austrian border. There have been also reports of shipments from Iran via the Caucasus region to the Ukraine and then to Romania for final destinations in Western Europe.

The increase in European seizures was primarily due to the doubling of opiate seizures in South-East Europe (Balkan route countries). The largest increases in South-East Europe were reported by Turkey, Serbia & Montenegro, Croatia and Albania. More than 15 metric tons were seized in South East Europe, exceeding the total seizures made in West & Central Europe (9 metric tons) and Eastern Europe (4 metric tons in European C.I.S. countries).

Turkey more than doubled its seizures and accounted with more than 13 metric tons for 47 per cent of all European opiate seizures in 2004. Thus, the Turkish authorities reported, once again, most opiate seizures in Europe, a position the country has held without interruption since 1987. The use of improved risk assessment tools also appears to have contributed to this increase.

The second largest opiate seizures in Europe, for the second year in a row, were reported by the Russian Federation (4 metric tons or 14 per cent of European opiate seizures).

Fig. 27: Average purity* of heroin in the England & Wales: 1997 to 4th quarter of 2005



*unweighted results of police and customs
Source: UK Forensic Science Service.

The largest seizures among West European countries were made by the authorities in United Kingdom[19], Italy, Netherlands, Germany and France. United Kingdom, Italy and Netherlands accounted for close to 70 per cent of all opiate seizures in West & Central Europe in 2004. If Germany and France are included, that proportion rises to close to 85 per cent.

The United Kingdom is Europe's main opiate market and a final destination country. Usually, opiates are trafficked to the United Kingdom via the Balkan route. However, for 2004, it has been reported that heroin has also been trafficked by air from Pakistan. An estimated 25 per cent of total trafficked opiates is estimated to enter the United Kingdom that way. Further reports received in 2005/2006 indicate that heroin shipments are trafficked from Bangladesh to Pakistan for onward trafficking to the United Kingdom. The increased trafficking of heroin towards the United Kingdom has already become apparent in the increases in heroin purity for England & Wales, an indicator for improved supply.

Italy is Europe's second largest market for opiates as well as an important transit country. In 2004, an estimated 71 per cent of all seizures were destined for domestic use, with the remaining portion destined for transit to other countries, mainly Germany (26 per cent). Fifty eight per cent of the identified heroin deliveries entered Italy via Albania and 21 per cent were brought to Italy directly via Turkey. Eighty five per cent of all opiates enter Italy by sea. Seizures in Italy – in contrast to many other countries - remained unchanged in 2004.
The Netherlands is primarily an important transhipment location of opiates to other countries in West Europe, primarily France, Belgium, United Kingdom and Germany. The involvement of Dutch groups in this trade is, however, limited. Seizures in the Netherlands tripled in 2004, like seizures in neighbouring Belgium.

Increases in opiate seizures in 2004 were also reported from several countries in West and Central Europe, e. g. Poland (6-fold), Austria (5-fold), Czech Republic (4-fold), the Nordic countries: Denmark, Norway and Sweden (2-fold); Luxembourg (+70 per cent), Germany (+20 per cent), Spain (+12 per cent) and France (+5 per cent).

These seizures – in combination with hardly any noticeable heroin price changes - indicate a rising supply and thus higher availability of opiates in Europe. However, this has not – as yet – entailed an increase in the demand for opiates in Western Europe.

19 Latest data available for the UK refer to the year 2003.

Opiate seizures in Africa increase by 60 per cent

Opiate seizures in Africa also showed a strong increase in 2004 (+60 per cent). The bulk of this increase is due to seizures made in West and Central Africa which more than doubled between 2003 and 2004. West and Central Africa accounted for 63 per cent of all African heroin seizures in 2004. Increases were also reported and from Eastern Africa (+18 per cent), which accounts for 20 per cent of African seizures and from Northern Africa (+30 per cent), which accounts for 12 per cent of African opiate seizures. Heroin is trafficked through African states for markets in Europe and, to a lesser extent, North America. Sources of the opiates are both countries in South-West Asia (mainly Pakistan) and South-East Asia (mainly Thailand). The overall amounts of opiates seized in Africa are, however, still very modest (0.3 per cent of global opiate seizures), mainly reflecting inadequate law enforcement capabilities.

In South-East Asia, opiate seizures remain stable…

Opiates seizures in East and South-East Asia remained essentially stable in 2004 at 13 metric tons. China accounted for 82 per cent of these seizures, followed by Myanmar (8 per cent) and Thailand (6 per cent). With a seizure level of 11 metric tons, China reported the third largest opiate seizures worldwide after Iran and Pakistan. If only heroin is considered, China had with 10.8 metric tons – for the fourth year in a row – the world's largest heroin seizures.

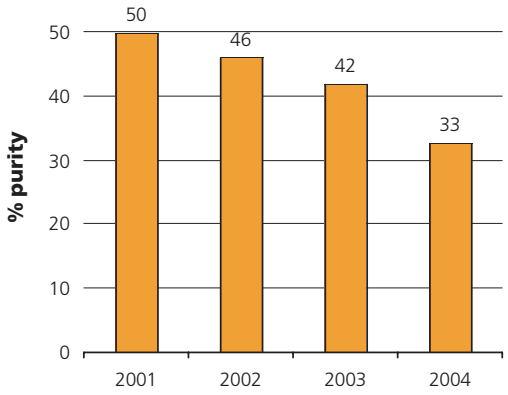
…Sharp fall in Oceania …

A sharp drop in opiate seizures was recorded for Oceania. Opiate seizures in Australia in 2003-2004 dropped by 86 per cent and were the lowest since 1986. Most of the heroin seized in Australia continues to originate in South-East Asia.

… Decline in the Americas.

Opiates seizures declined in the Americas in 2004 (-29 per cent), primarily reflecting lower levels of opiate seizures in Mexico (-80 per cent) and in the United States (-22 per cent). The main trafficking routes for heroin are from Mexico and from Colombia to the United States. The largest seizures of opiates in the Americas in 2004 were made by the United States, followed by Colombia. At the global level, the USA ranked 10th in terms of opiate seizures in 2004.

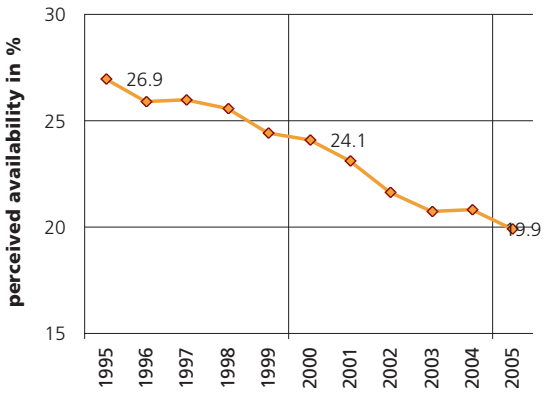
Fig. 28: Retail purity of Colombian heroin in the USA 2001-2004



Source: ONDCP, *National Drug Control Strategy 2006*.

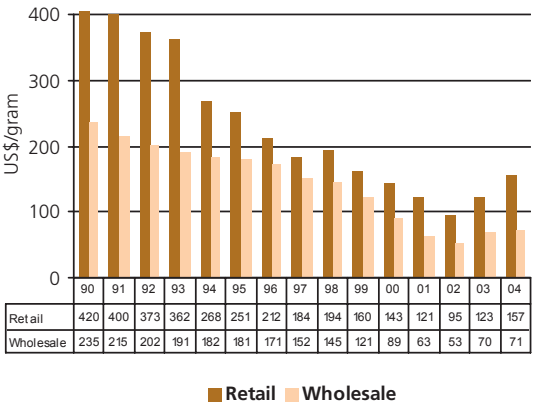
In line with declining levels of supply, heroin prices started rising in the USA in 2004. Retail purity of Colombian heroin in the USA showed a clear downward trend over the 2001-2004 period. Availability of heroin, as perceived among US high-school students, has even shown a downward trend over the last decade.

Fig. 29: Perceived availability of heroin among US high-school students (unweighted average of 8th, 10th and 12th graders seeing it 'fairly easy' or ' very easy' to get heroin)



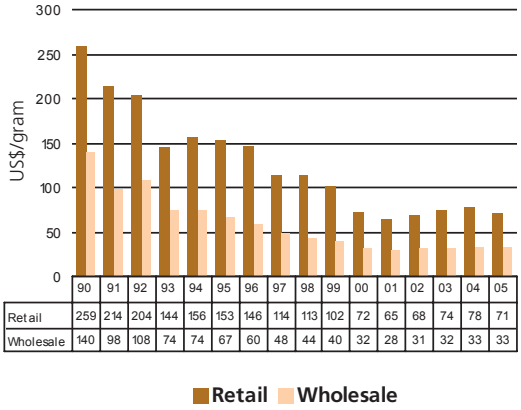
Source: NIDA, Monitoring the Future.

Fig. 30: USA: Heroin retail and wholesale prices (US$/gram), 1990-2004



	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Retail	420	400	373	362	268	251	212	184	194	160	143	121	95	123	157
Wholesale	235	215	202	191	182	181	171	152	145	121	89	63	53	70	71

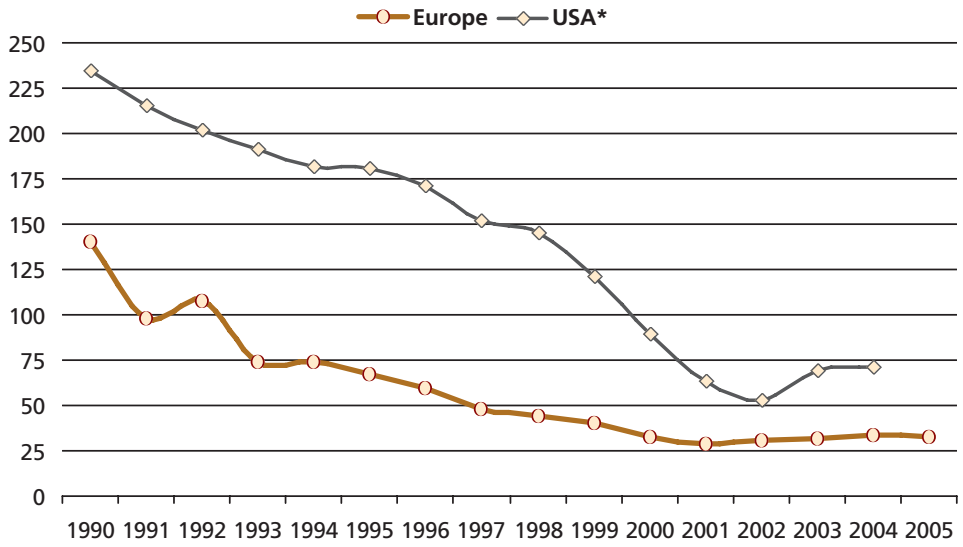
Fig. 31: Europe: Heroin retail and wholesale prices (US$/gram), 1990-2005



	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
Retail	259	214	204	144	156	153	146	114	113	102	72	65	68	74	78	71
Wholesale	140	98	108	74	74	67	60	48	44	40	32	28	31	32	33	33

Note: Retail and wholesale prices are not directly comparable because purity levels differ.

Fig. 32: Wholesale heroin prices in Europe and the USA (US$/gram, 1990-2005, at street purity)



* 2005 data not available

Map 4. Seizures of opium in Asia in 2004 (only highest ranking countries represented)

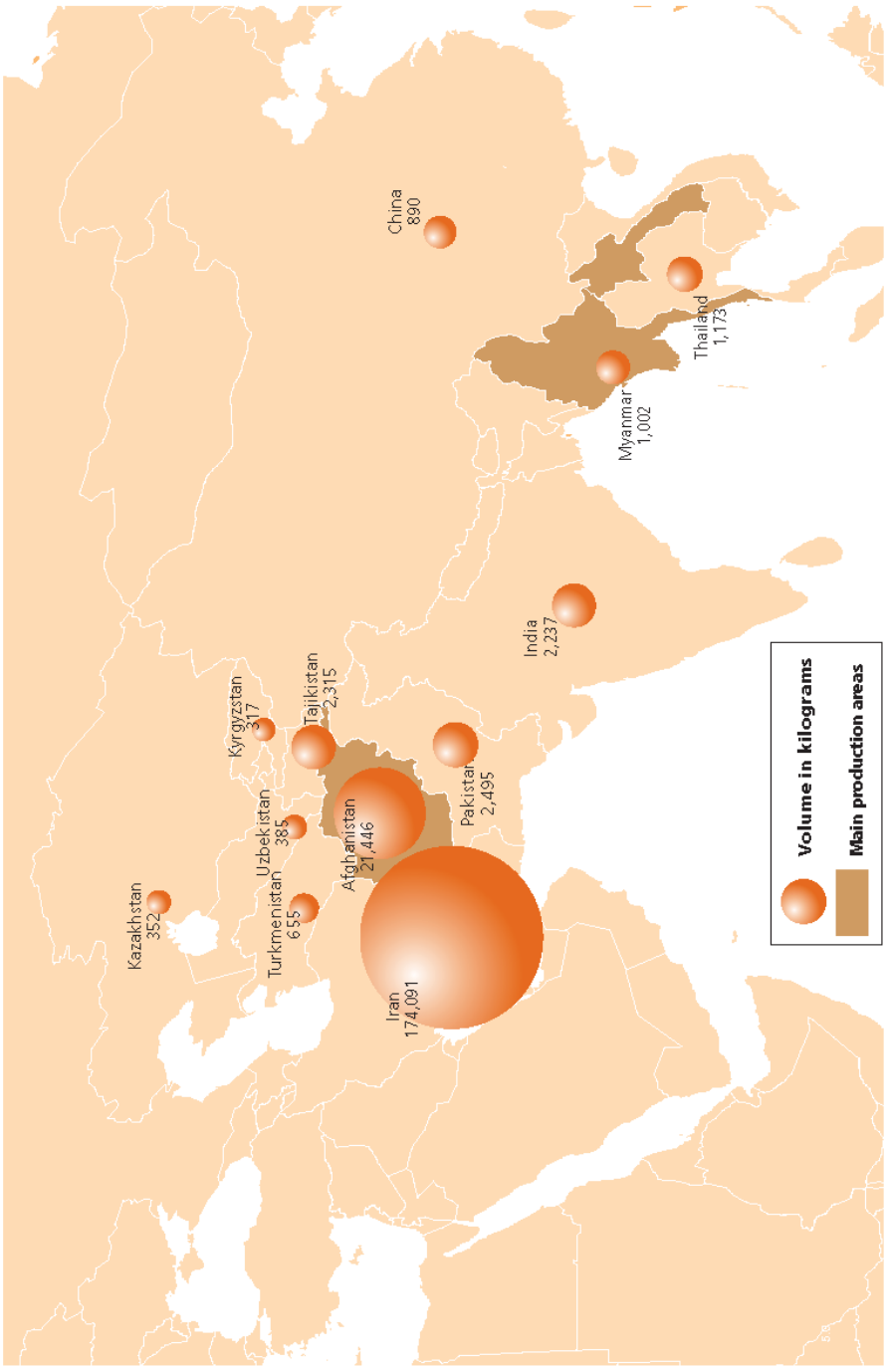
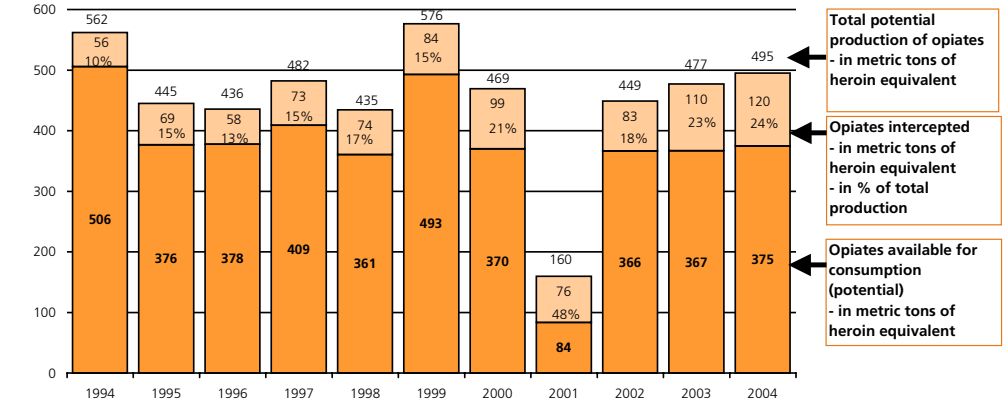
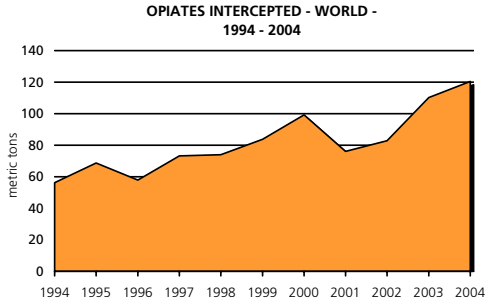
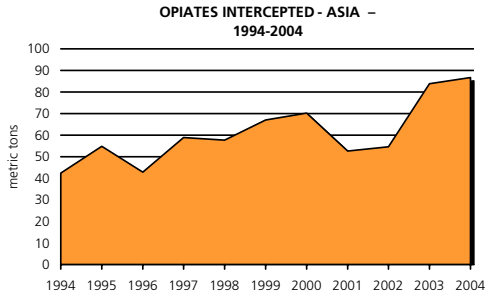
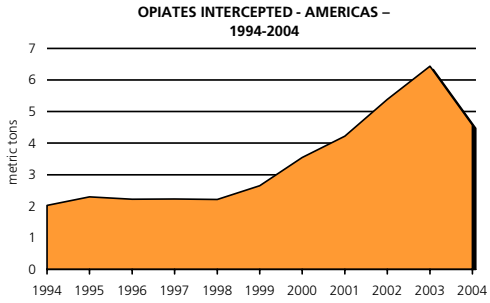


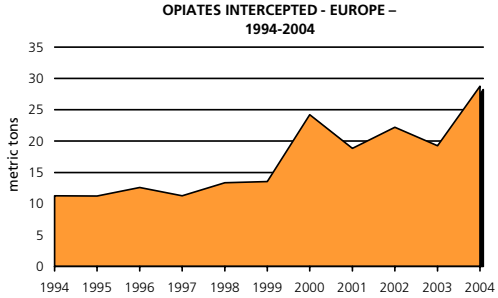
Fig. 33: Global illicit supply of opiates, 1994 - 2004

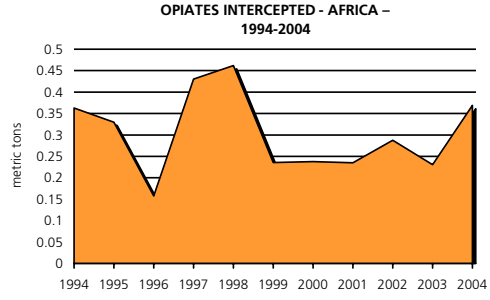












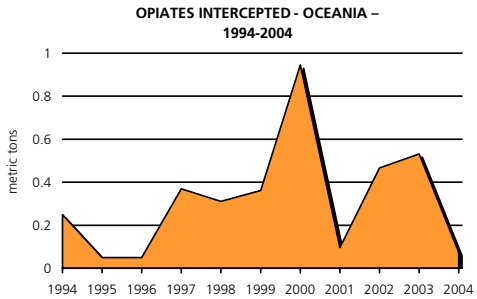
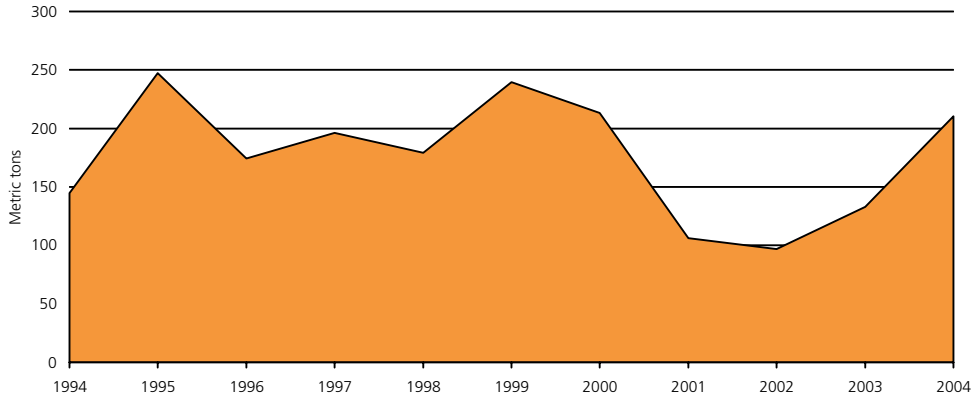


Fig. 34: Global seizures of opium, 1994 - 2004



Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Metric tons	145	247	174	196	179	239	213	106	97	133	210

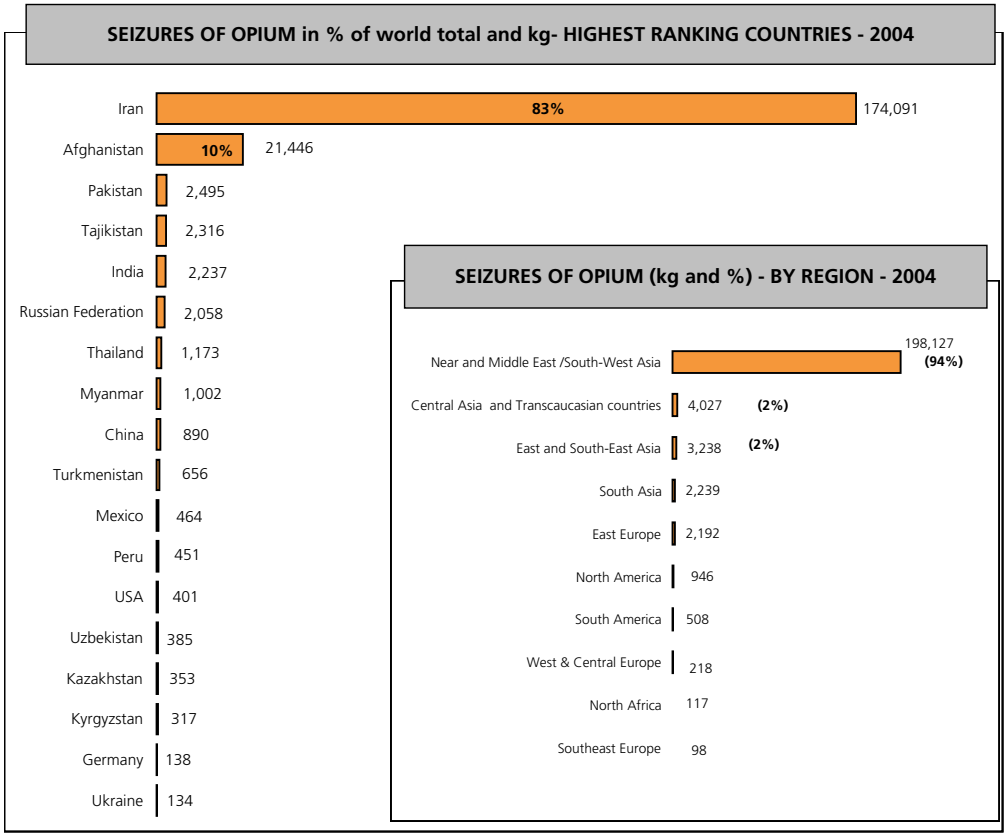
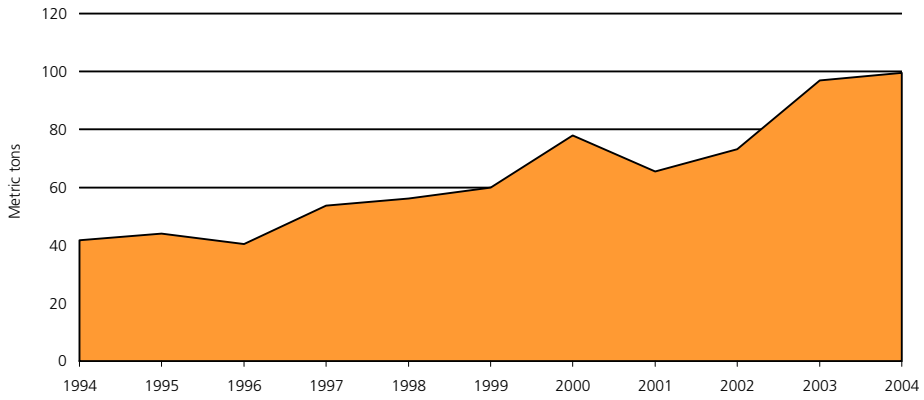
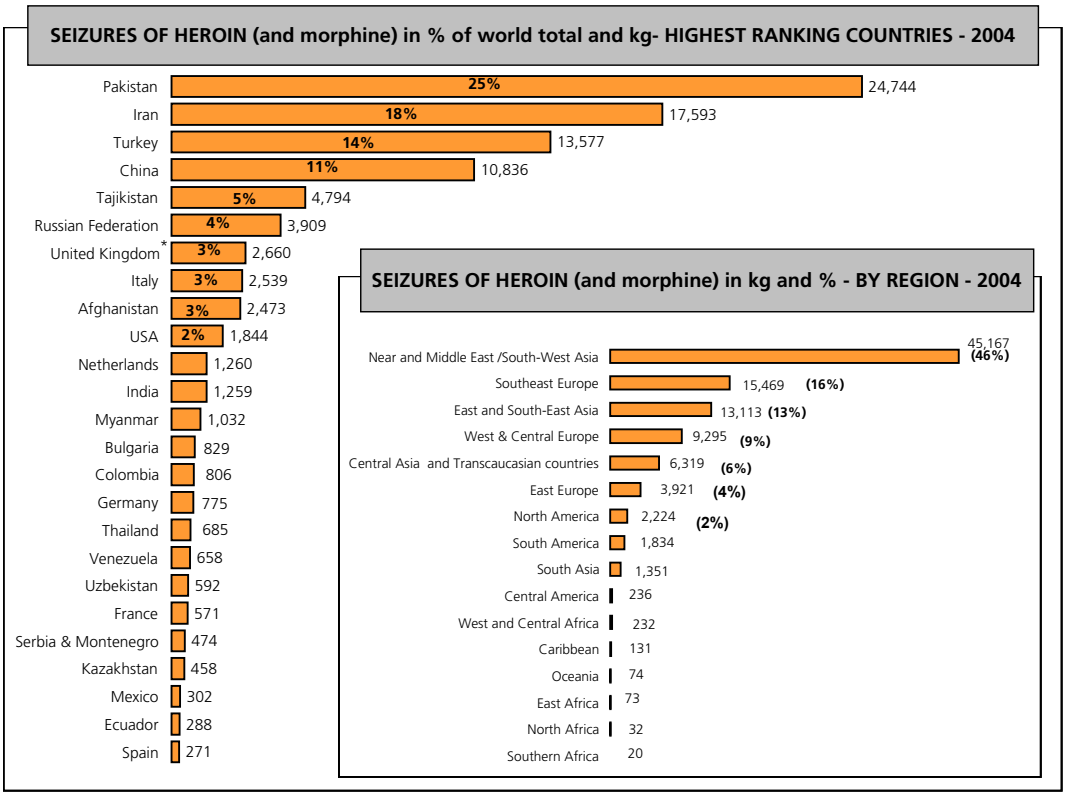


Fig. 35: Global seizures of heroin and morphine*, 1994 - 2004



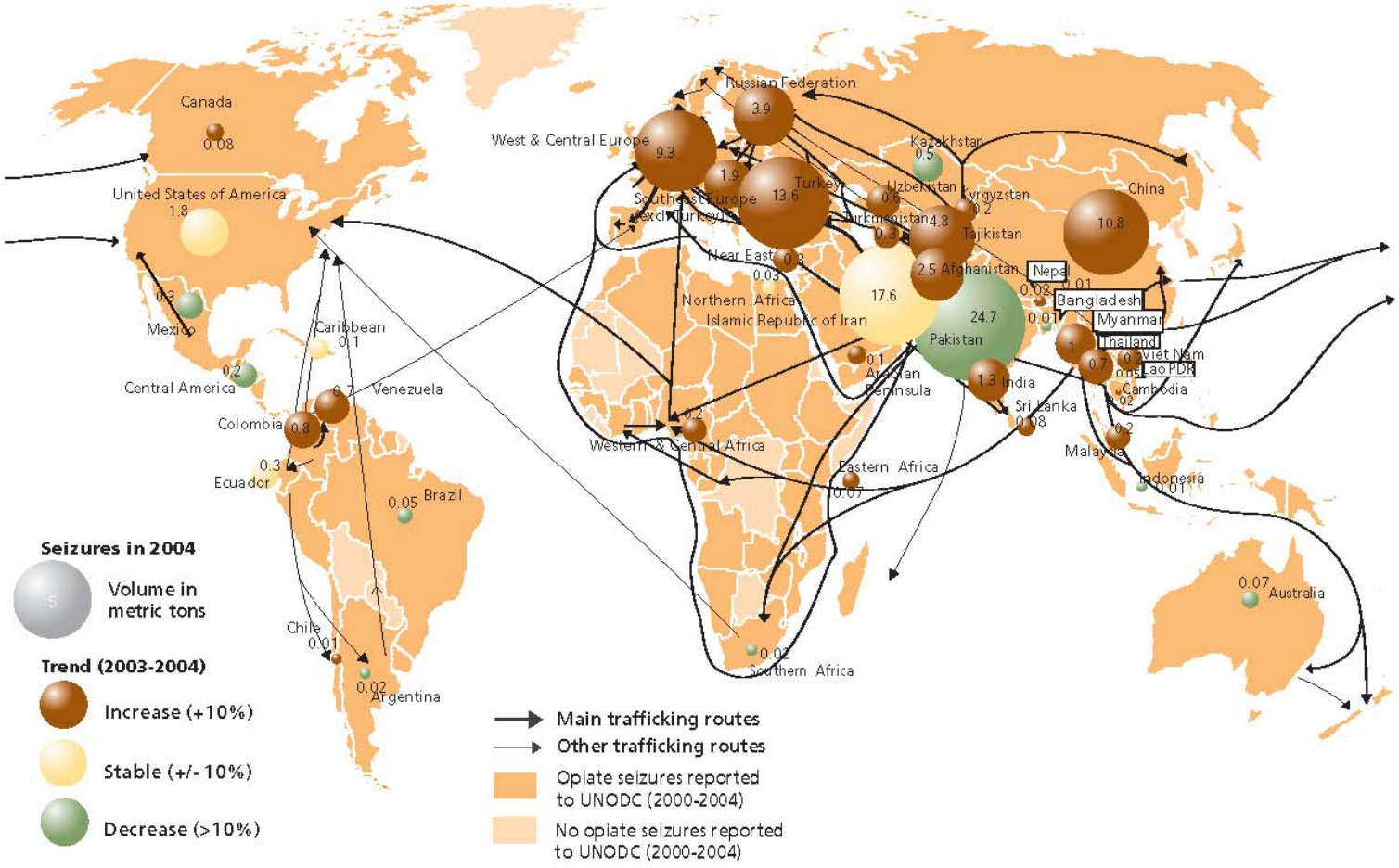
* metric ton equivalents. 1 kilogram of morphine is assumed to be 1 kilogram of heroin.

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Metric tons	42	44	40	54	56	60	78	66	73	97	99



* data refer to 2003

Map 5: Heroin and morphine seizures 2003 - 2004 : extent and trends (countries reporting seizures of more than 0.01 mt (10 kg.))



Note: Routes shown are not necessarily documented actual routes, but are rather general indications of the directions of illicit drug flows.

1.3.3 Abuse

Global abuse of opiates remains essentially stable

Almost 16 million people in the world, or 0.4 per cent of the world's population age 15-64, are abusers of opiates. The prevalence estimate has remained essentially stable compared to the one published in the 2005 World Drug Report.

Opiates continue to be the main problem drug worldwide, accounting for almost two thirds of all treatment demand in Asia and close to 60 per cent of treatment demand in Europe.

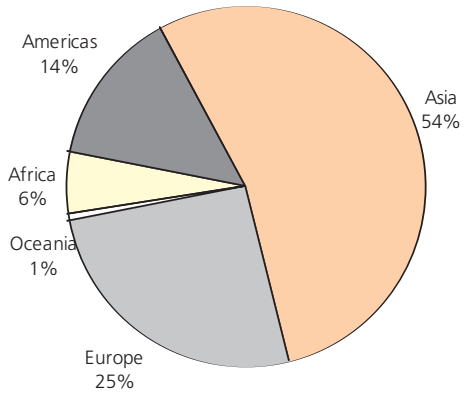
Highest level of opiates abuse along the main opiate trafficking route

More than half of the world's opiates abusing population live in Asia and the highest levels of opiates abuse are along the main drug trafficking routes originating from Afghanistan. Annual prevalence of opiates, including heroin, is high, for example, in the Islamic Republic of Iran where the number of drug abusers is said to exceed 1.2 million (2.8 per cent of the general population age 15-64). It is also high in Kyrgyzstan (2.3 per cent of the population age 15-64) and Kazakhstan (1.3 per cent), and the number of registered drug users has continued to rise. The number of opiate users in Pakistan is estimated at around 0.7 million, including half a million using heroin (based on study results of 2000/2001). A study published in India in 2004 revealed prevalence rates of around 0.7 per cent for males[20] , which is equivalent to an annual prevalence of around 0.4 per cent of the general population age 15-64 or slightly less than 3 million people. While abuse estimates for China show a rather low prevalence rate of less than 0.2 per cent, this is still equivalent to 1.7 million people.

The West and Central European opiates market is estimated to encompass some 1.6 million people. Major opiates markets in Western Europe are the United Kingdom (some 340,000), Italy (300,000), Spain (190,000), Germany and France (about 170,000 persons each) and Portugal (50,000).

In the Americas, the largest opiates market is the United States with less than 1.2 million heroin users. According to national household survey results, Brazil is the largest opiates market in South America, with an estimated 700,000 users. It should be noted that most opiates users in Brazil use synthetic opiates and heroin abuse levels are very low.

Fig. 36: Regional breakdown of opiates abusers



Sources: UNODC, Annual Reports Questionnaire Data, Govt. reports, reports of regional bodies, UNODC estimates.

Heroin abusers make up about 71 percent of opiate abusers

Globally about 71 per cent of the world's 16 million opiates abusers are abuse heroin, an estimated 11 million people. However, the proportions vary by region. Whereas almost all opiate consumers in Africa are reportedly abusing heroin, about two thirds of opiate

20 UNODC and Ministry of Social Justice and Empowerment, Government of India, The Extent, Pattern and Trends of Drug Abuse in India, National Survey, 2004.

abuses abusers consume heroin in Asia where use of opium is still widespread in a number of countries. Asia and Europe together account for 80 per cent of the world's heroin abusers.

The number of heroin abusers in West and Central Europe has been stable over the past few years and is estimated at around 1½ million. The number of heroin abusers in East Europe is estimated to be already higher than the corresponding number for West & Central Europe. Estimates of heroin abuse in Europe as a whole (3.3 million people) are higher than the corresponding estimates for the Americas as a whole (1 ½ million people). The largest numbers of heroin abusers are, however, found in Asia, accounting with 5.4 million for almost half of all heroin users worldwide.

Heroin abuse, by injection, exposes drug users to HIV/AIDS. Injecting drug use has propelled HIV/epidemics, inter alia, in India, Indonesia, Iran (Islamic Republic of), Libyan Arab Jamahiriya, Pakistan, Spain, Ukraine, Uruguay and Viet Nam, according to the Joint United Nations Programme on HIV/AIDS. In China, Central Asia and several countries of East Europe injecting drug use has been the most frequently cited mode of transmission for HIV among HIV/AIDS cases in recent years.

Countries in East Africa, particularly Kenya, Mozambique and United Republic of Tanzania, have reported large increases in heroin abuse. A large increase of opiate abuse has been also reported by some countries in West Africa, including Côte d'Ivoire and Senegal. These increases are possibly a spillover effect due to increased availability of heroin which is trafficked through the region destined towards markets in Europe and North America.

Opiate abuse continues rising in Asia, mainly among countries close to Afghanistan - though falling in East and South-East Asia

UNODC's drug use perception trend, based on expert opinion gathered from Member States, suggests that opiate use continued growing in Asia in 2004, mainly reflecting increases in opiate abuse reported from neighbouring countries of Afghanistan, including the central Asian countries and most countries in South and South-West Asia.

Table 6. Annual prevalence of opiate abuse, 2003-2005

	Abuse of opiates		of which abuse of heroin	
	Number of abusers	in % of population age 15-64	Number of abusers	in % of population age 15-64
EUROPE	4,030,000	0.7	3,340,000	0.6
West & Central Europe	1,565,000	0.5	1,445,000	0.5
South-East Europe	180,000	0.2	175,000	0.2
Eastern Europe	2,285,000	1.6	1,720,000	1.2
AMERICAS	2,280,000	0.4	1,540,000	0.3
North America	1,300,000	0.5	1,240,000	0.4
South America	980,000	0.3	300,000	0.1
ASIA	8,530,000	0.3	5,430,000	0.2
OCEANIA	90,000	0.4	30,000	0.2
AFRICA	910,000	0.2	910,000	0.2
GLOBAL	**15,840,000**	**0.4**	**11,250,000**	**0.3**

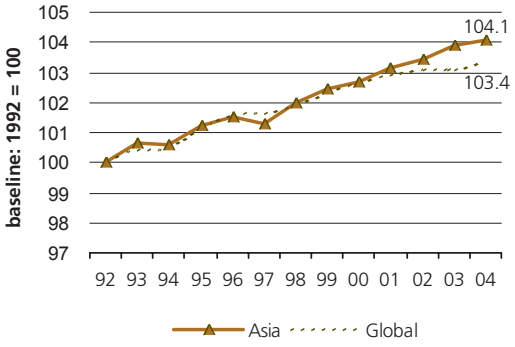
Above global average
Around global average
Below global average

Sources: UNODC, Annual Reports Questionnaire data, various Govt. reports, reports of regional bodies, UNODC estimates.

In contrast, most countries of East and South-East Asia reported declines in opiate abuse in 2004, apparently reflecting the strong declines of opium production in Myanmar and Lao PDR. These declines were, however, not sufficient to offset the increases in opiate use among neighbouring countries of Afghanistan.

Over a 12-year period (1992-2004) the drug use trend for Asia followed the global trend line, except for the last few years in which the increase was far more important in Asia than at the global level. Thus, by 2004, the drug use perception indicator for Africa was already clearly above the global average and above the threshold line of a 'significant increase.

Fig. 37: Twelve-year opiate use trends as perceived by experts : Asia

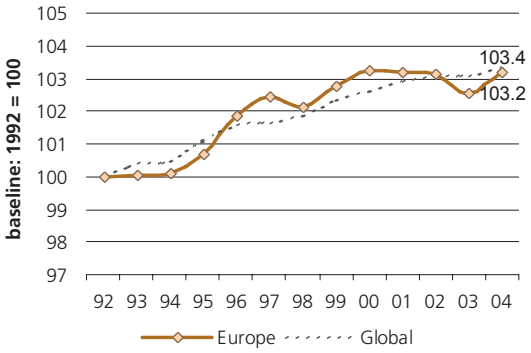


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Stable to declining use levels in West and Central Europe but rising abuse levels in East Europe

Opiate abuse remained largely stable or declined in West and Central Europe in 2004 according to reports received from Member States. A number of indirect indicators (treatment demand, arrest figures, drug-related deaths etc.) seem to confirm this assessment. This ongoing positive trend was, however, offset by rising levels of opiate abuse reported from East Europe (C.I.S. countries) as well as some countries of south-eastern Europe along the Balkan route, which are already suffering from a supply push of Afghan opiates. The net result was a small increase in UNODC's drug use perception trend for opiates in Europe. Nonetheless, the drug use perception trend for Europe is still marginally below the global average and basically at the same levels as in 2000 suggesting that consumption of opiates - overall - has stabilized in recent years, following years of strong increase in the 1990s.

Fig. 38: Twelve-year opiate use trends as perceived by experts: Europe

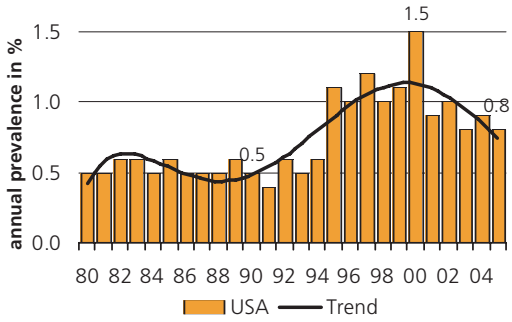


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Stable to declining trend of opiate abuse in the Americas

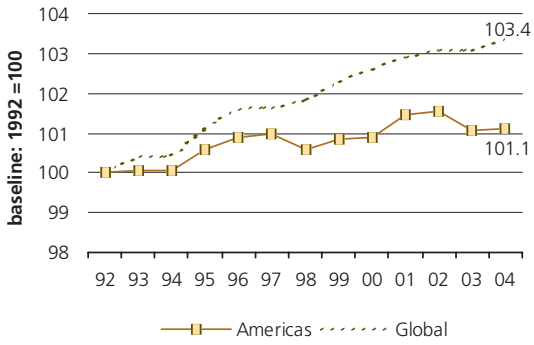
UNODC's drug use perception trend shows essentially stable results for opiate abuse in the Americas for 2004 and some decline since 2001/02. This trend is reflected

Fig. 39: Annual prevalence of heroin use among 12th graders in US high-schools, 1980-2005



Source: NIDA, Monitoring the Future, Overview of Key Findings 2005.

Fig. 40: Twelve-year opiate use trends as perceived by experts: Americas



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

in school survey results from the United States and Canada which show that after increases in the 1990s, heroin use is declining again. In the United States, heroin remained essentially stable, at the lower levels, over the 2003-2005 period. Falling opium production levels in Latin America as well as in South-East Asia - the two main traditional supply lines for the North American market - may have contributed to this.

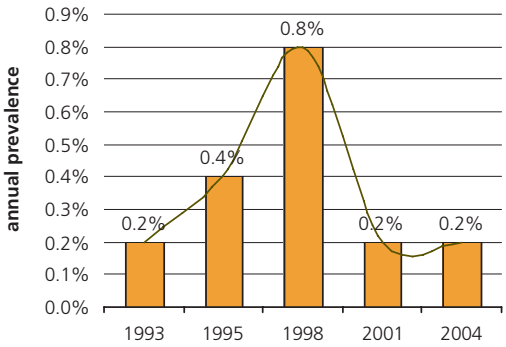
Opiate use in Oceania continues to remain below levels recorded in 2000

The most striking shifts in UNODC opiate drug use perception trend were reported from Oceania. Following strong increases in the 1990s, expert perception on the trends declined after 2000.

Oceania, and notably Australia, used to have some of the highest opiate prevalence rates worldwide. This changed after a major heroin shortage in 2001, prompted by the dismantling of some major heroin trafficking networks which had supplied the Australian market with heroin from South-East Asia. The 'heroin drought' prompted a fall in the purity levels while heroin prices rose strongly, thus squeezing large sections of heroin users out of the market. The number of drug-related deaths declined substantially. Fears that higher prices for heroin would result in higher crime did not materialize. Contrary to some concerns, the changes were not short-lived but the reduced availability of heroin lasted until well into 2005.

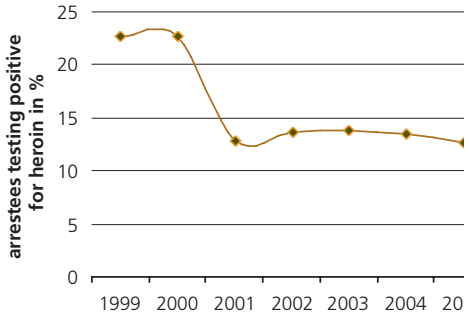
The 2004 National Drug Strategy Household Survey showed that annual prevalence of heroin use - after having fallen drastically in 2001 - remained stable at the lower levels in 2004. In addition, first results of the ongoing Drug Use Monitoring in Australia project (DUMA), where arrested people at selected police stations across the country are regularly tested for drug abuse, suggest that this positive trend also continued in 2005.

Fig. 41: Australia: heroin use among the general population (age 14 and above), 1993-2004



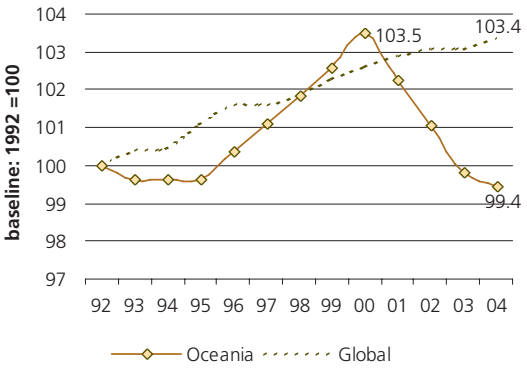
Source: Australian Institute of Health and Welfare, 2004 National Drug Strategy - Household Survey.

Fig. 42: Testing of arrestees for heroin abuse in Australia*



* unweighted average of results from Western Australia (East Perth), South Australia (Adelaide), New South Wales (Sydney) and Queensland (Brisbane and Southport).
Source: Australia Institute of Criminology, Drug Use Monitoring in Australia (DUMA).

Fig. 43:Twelve-year opiate use trends as perceived by experts: Oceania



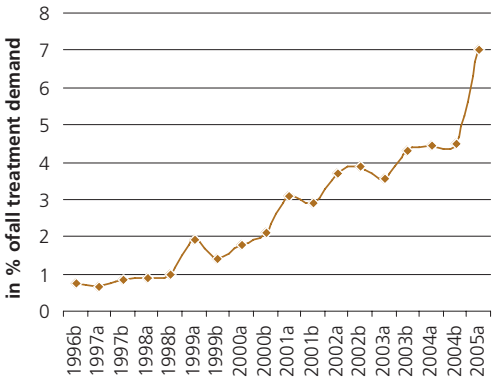
Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Opiate use in Africa starts rising

Drug use trends reported from Africa suggest that opiate abuse has started rising, notably in countries of Eastern and Southern Africa and some countries in West Africa, apparently linked to trafficking activities and resulting spill-over effects. The upward trend is particularly noted in South Africa where heroin used to account for less than 1 per cent of treatment demand (including alcohol). By the first two quarters of 2005, this proportion had increased to 7 per cent.

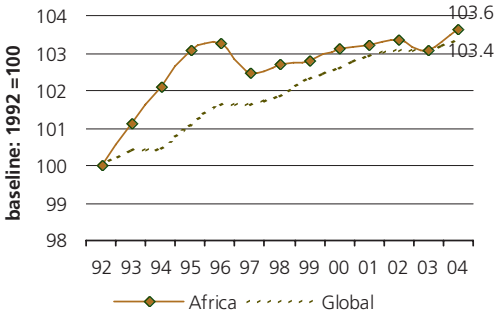
For the 1992-2004 period as a whole, opiate use trends, as reported by African States to UNODC, show a marginally higher level of increase than at the global level. The increase in 2004 was the strongest over the last few years.

Fig. 44: South Africa - heroin as primary drug in treatment demand*



* unweighted average of treatment (incl. alcohol) in 6 provinces.
Source: SACENDU, Research Brief, Vol. 8 (2), 2005.

Fig. 45: Twelve-year opiate use trends as perceived by experts: Africa

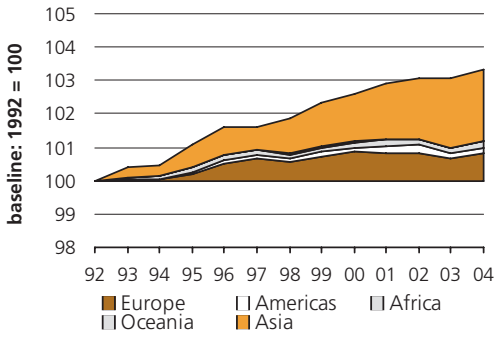


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Composite opiate use perception trends increase reflecting higher use in Asia

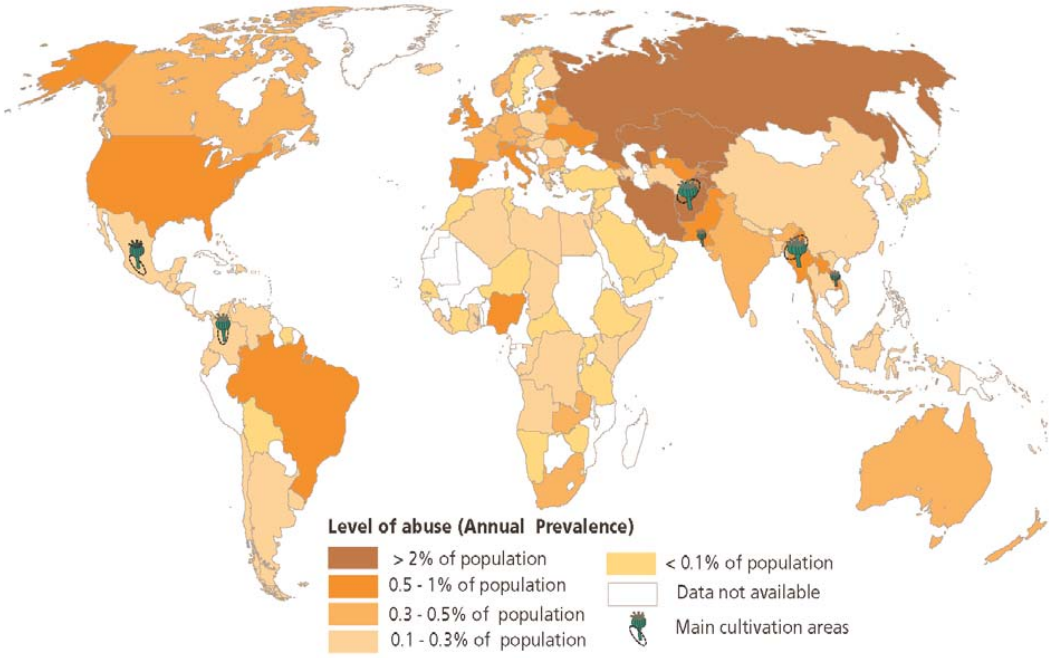
If the composite indicator is broken down by regions, data show that the increase over the last decade was primarily due to higher use of opiates in Asia. In contrast, for the other regions, notably for Europe, and the Americas, the markets appear to have been rather stable since 2000.

Fig. 46: Twelve-year drug use trends as perceived by experts: opiates

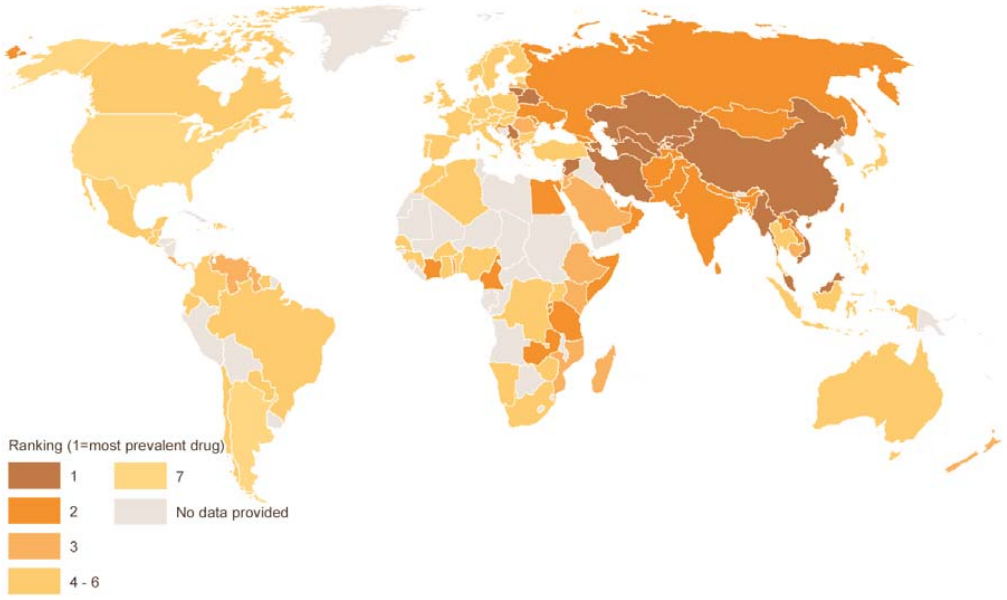


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Map 6: Abuse of opiates (including heroin) 2003 - 2005 (or latest year available)

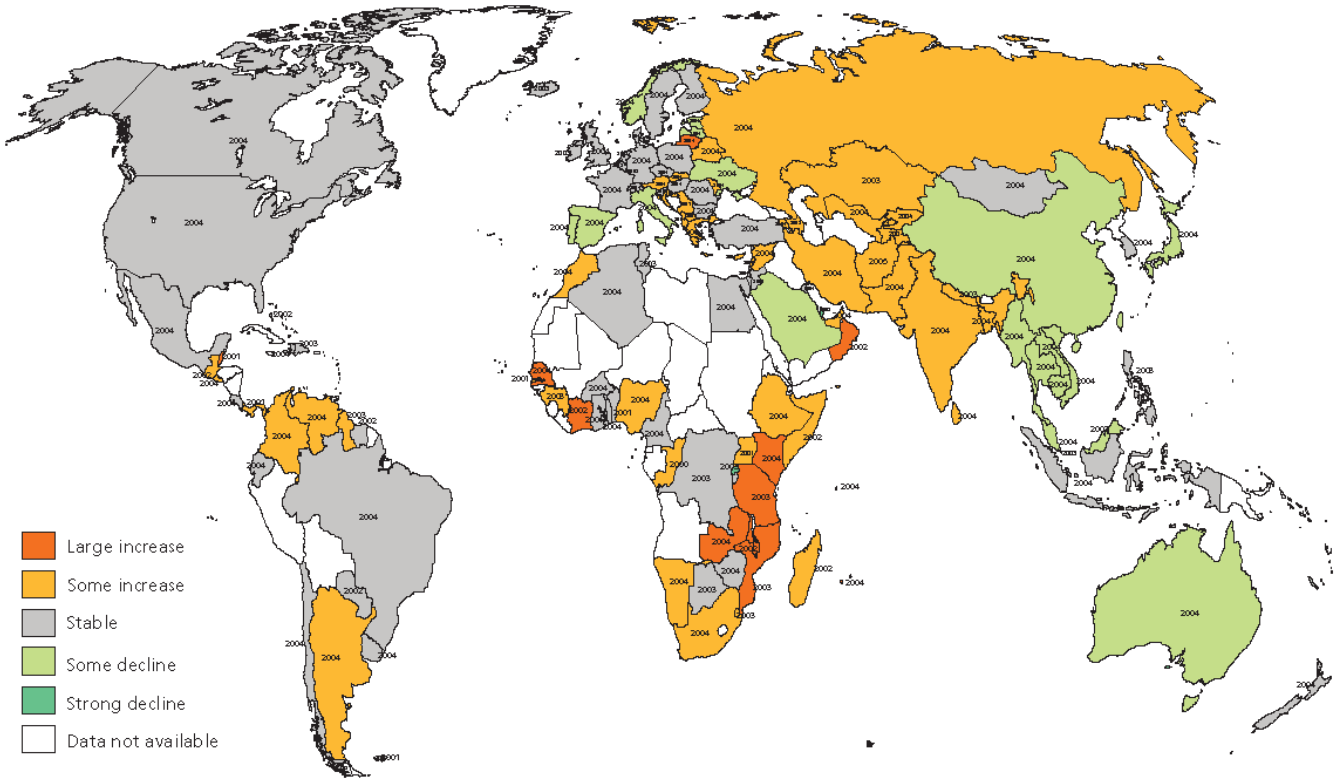


Map 7: Ranking of opiates in order of prevalence in 2004



Sources: UNODC Annual Reports Questionnaires data, SAMSHA US National Household Survey on Drug Abuse, Iranian Ministry of Health, Rapid Assessement Study and UNODC ARQ,Council of Europe, ESPAD.

Map 8: Change in abuse of heroin and other opiates, 2004 (or latest year available)



Sources: UNODC Annual Reports Questionnaires data, National Household Surveys submitted to UNODC, United States Department of State (Bureau for International Narcotics and Law Enforcement Affairs), International Narcotics Control Strategy Report, Law Enforcement Reports, SACENDU (South African Community Epidemiology Network, UNODC, Meetings of Heads of Law Enforcement Agencies (HONLEA), UNODC Opium Surveys.

1.4 Coca / Cocaine market

1.4.1 Production

Table 7. GLOBAL ILLICIT CULTIVATION OF COCA BUSH AND PRODUCTION

GLOBAL ILLICIT CULTIVATION OF COCA BUSH AND PRODUCTION OF COCA LEAF AND COCAINE, 1990-2005																
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
CULTIVATION[a] OF COCA BUSH IN HECTARES																
Bolivia [b]	50,300	47,900	45,300	47,200	48,100	48,600	48,100	45,800	38,000	21,800	14,600	19,900	21,600	23,600	27,700	25,400
Colombia [c]	40,100	37,500	37,100	39,700	44,700	50,900	67,200	79,400	101,800	160,100	163,300	144,800	102,000	86,000	80,000	86,000
Peru [d]	121,300	120,800	129,100	108,800	108,600	115,300	94,400	68,800	51,000	38,700	43,400	46,200	46,700	44,200	50,300	48,200
Total	**211,700**	**206,200**	**211,500**	**195,700**	**201,400**	**214,800**	**209,700**	**194,000**	**190,800**	**220,600**	**221,300**	**210,900**	**170,300**	**153,800**	**158,000**	**159,600**
POTENTIAL PRODUCTION OF DRY COCA LEAF IN METRIC TONS [e]																
Bolivia	77,000	78,000	80,300	84,400	89,800	85,000	75,100	70,100	52,900	22,800	13,400	20,200	19,800	27,800	38,000	30,900
Colombia	45,300	45,000	44,900	45,300	67,500	80,900	108,900	129,500	165,900	261,000	266,200	236,000	222,100	193,340	170,730	170,730
Peru	196,900	222,700	223,900	155,500	165,300	183,600	174,700	130,600	95,600	69,200	46,200	49,300	52,500	50,790	70,300	67,900
Total	**319,200**	**345,700**	**349,100**	**285,200**	**322,600**	**349,500**	**358,700**	**330,200**	**314,400**	**353,000**	**325,800**	**305,500**	**294,400**	**271,930**	**279,030**	**269,530**
POTENTIAL MANUFACTURE[f] OF COCAINE IN METRIC TONS																
Bolivia	189	220	225	240	255	240	215	200	150	70	43	60	60	79	107	90
Colombia [g]	92	88	91	119	201	230	300	350	435	680	695	617	580	550	640	640
Peru	492	525	550	410	435	460	435	325	240	175	141	150	160	155	190	180
Total	**774**	**833**	**866**	**769**	**891**	**930**	**950**	**875**	**825**	**925**	**879**	**827**	**800**	**784**	**937**	**910**

(a) Potentially harvestable, after eradication

(b) Sources: 1990-2002: CICAD and US Department of State, International Narcotics Control Strategy Report; 2003-2005: National Illicit Crop Monitoring System supported by UNODC.

(c) Sources: 1990-1998: CICAD and US Department of State, International Narcotics Control Strategy Report; 1999-2005: National Illicit Crop Monitoring System supported by UNODC.

(d) Sources: 1990-1999: CICAD and US Department of State, International Narcotics Control Strategy Report; 2000-2005: National Illicit Crop Monitoring System supported by UNODC.

(e) Refers to the potential dry coca leaf production available for cocaine production, i. e. after deducting the amount, which governments report as being used for traditional or other purposes allowed under national law. In the absence of a standard definition of "dry coca leaf" and given considerable differences in the processing of the fresh coca leaf harvested, the figures may not always be comparable across countries.

(f) Amounts of cocaine that could be manufactured from locally produced coca leaf (due to imports and exports actual amounts of cocaine manufactured in a country can differ)

(g) Production data for 2004 and 2005 is based on new field research in Colombia.

Global cultivation of coca remained essentially stable in 2005

The total area under coca cultivation in Colombia, Peru and Bolivia amounted to 159,600 hectares in 2005 suggesting that the area under cultivation remained essentially stable (+ 1 per cent as compared to 2004).

However, the area under coca cultivation continues to be 28 per cent less than the levels recorded in 2000 (221,300 hectares) and lower than in any year of the 1990s. Most coca was cultivated in Colombia (54 per cent), followed by Peru (30 per cent) and Bolivia (16 per cent).

After four consecutive years of decline, over which coca cultivation decreased in Colombia, the total area under coca cultivation in that country increased by 6,000 hectares (8 per cent) to 86,000 hectares compared to last year's estimate of 80,000 hectares. The increase came about despite sustained eradication efforts of the Government of Colombia, with fumigation levels which have constantly remained above 130,000 hectares and an unprecedented level of manual eradication of 32,000 hectares.

In Peru, on the other hand, where the area under coca cultivation increased in 2004 to 50,300 hectares, the highest level since 1998, coca cultivation appears to decline slightly, to 48,100 hectares (-4%). Bolivia, the smallest producer of coca, has reduced the area under coca cultivation, from 27,700 hectares in 2004 to 25,400 hectares in 2005. Efforts to eradicate coca continued in both Bolivia and Peru.

Longer-term cultivation trends followed different patterns in the three Andean countries. Coca cultivation declined in both Peru and Bolivia in the second half of the 1990s but showed again an upward trend in the first years of the new millenium. In Colombia, in contrast, cultivation of coca leaf increased in the 1990s and showed a marked downward trend in subsequent years.

Overal level of cocaine production remains essentially stable

The potential production of cocaine reached 910 metric tons in 2005, about the same as a year earlier. Potential production in Colombia amounted to 640 metric tons, in Peru to 180 metric tons and in Bolivia to 90 metric tons. The level of overall production is practically unchanged from the levels of a decade ago.

Alternative livelihood programmes continue to be implemented

In order to bring about a sustained reduction of coca cultivation in the region, alternative development programmes continue to be undertaken in Colombia, Peru and Bolivia. In Ecuador, a similar project is being carried out, with the intention to prevent certain regions in the country to turn to illicit drug production.

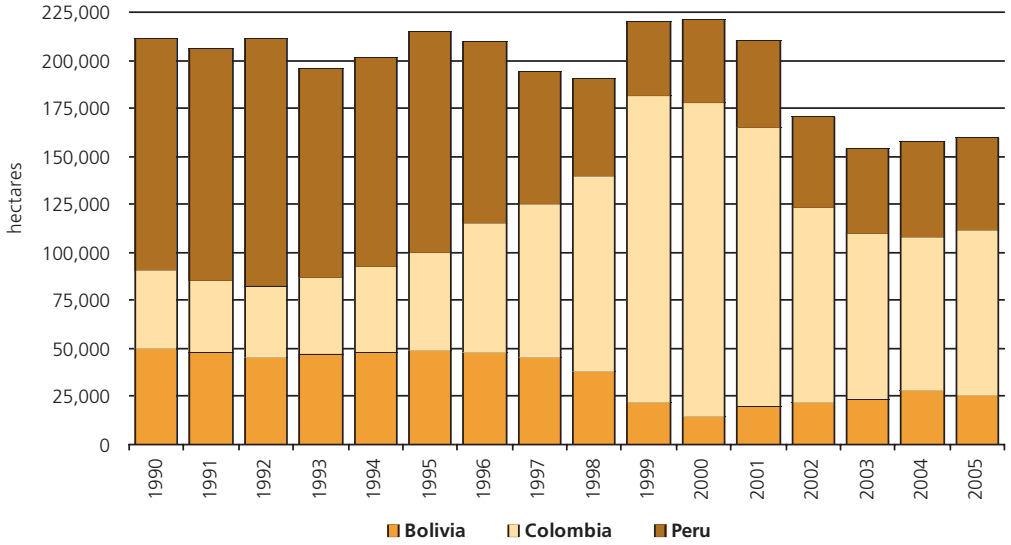
Number of seized coca processing laboratories almost quadrupled between 2000 and 2004

In 2004, Governments reported the destruction of 8,208 coca processing laboratories, an almost four-fold increase since 2000 when 2,104 laboratories were reported destroyed.

The destruction of laboratories and production sites reflects the fact that most processing of coca leaf into cocaine takes place close to the cultivating areas in Bolivia, Colombia and Peru. This is true for both the intermediate products cocaine paste/base and the final product, cocaine hydrochloride. Bolivia, Colombia and Peru reported more than 99 per cent of the global total.

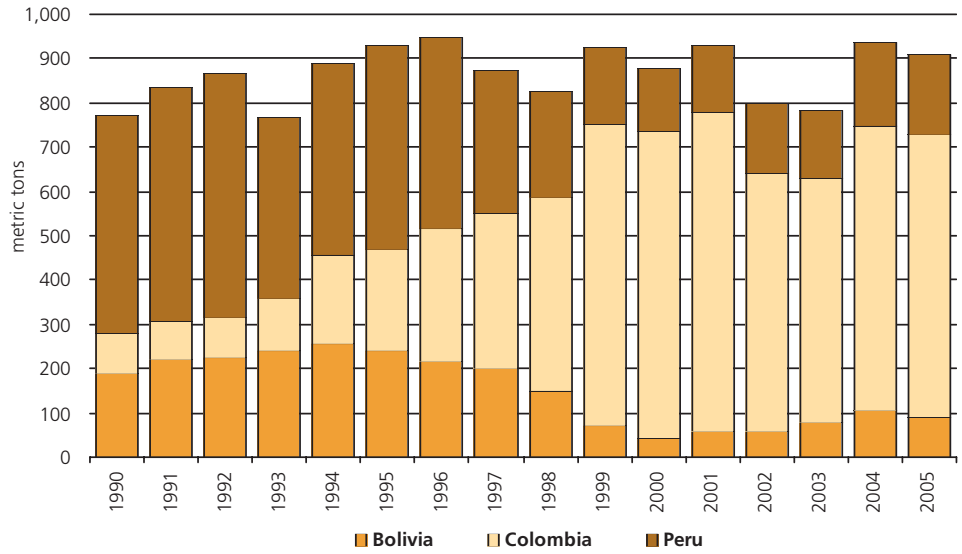
However, some differences exist between the three main coca cultivating countries. Whereas in Bolivia and Peru, destroyed laboratories produce to a large extent coca paste and coca base, some 13 per cent of all coca processing laboratories destroyed in Colombia were manufacturing cocaine. Ninety-four per cent of the 256 cocaine processing laboratories destroyed worldwide were located in Colombia. Outside South America, Spain, Hong Kong Special Administrative Region of China, United States and Australia reported the destruction of cocaine processing laboratories in 2004, which shows the existence of limited cocaine production outside the region. In addition, Argentina and Saint Lucia reported the destruction of laboratories manufacturing cocaine paste or base. All of this illustrates that some production of cocaine products exists outside the three main coca cultivating countries.

Fig. 47: Global coca bush cultivation (in ha), 1990-2005

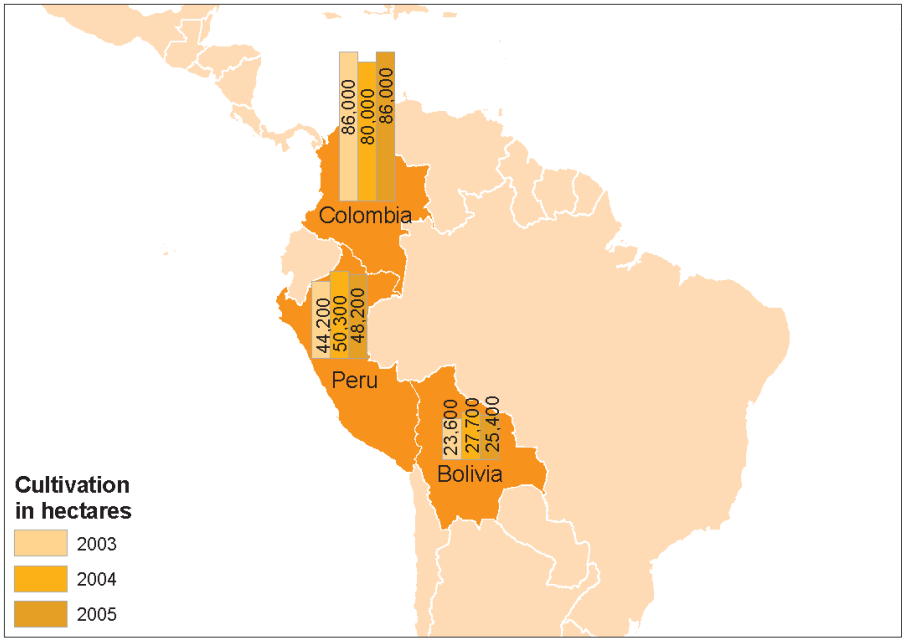


Source: Estimates for Colombia for 1999 and subsequent years come from the national monitoring system established by the Colombian government with the support of UNODC. Due to the change of methodology, figures for 1999 and after cannot be directly compared with data from previous years.

Fig. 48: Potential cocaine production (metric tons), 1990-2005



Map 9. Coca bush cultivation, 2003 - 2005



Map 10. Potential cocaine production, 2003 - 2005

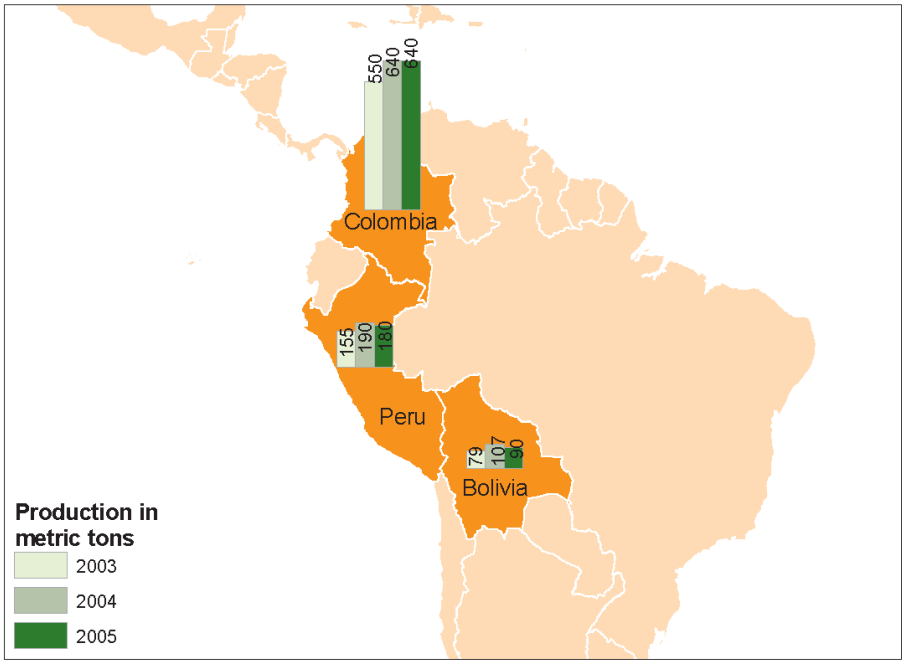
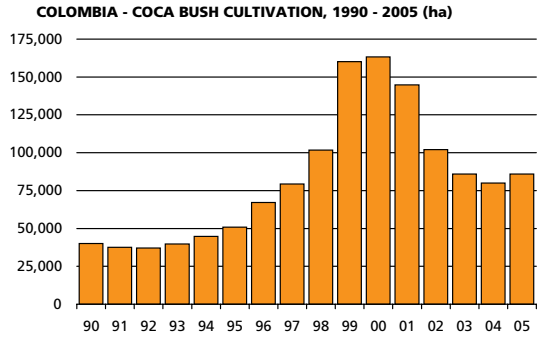
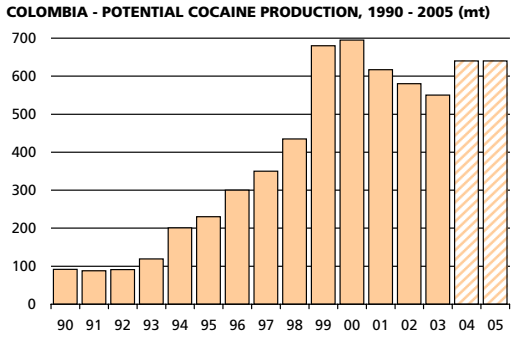
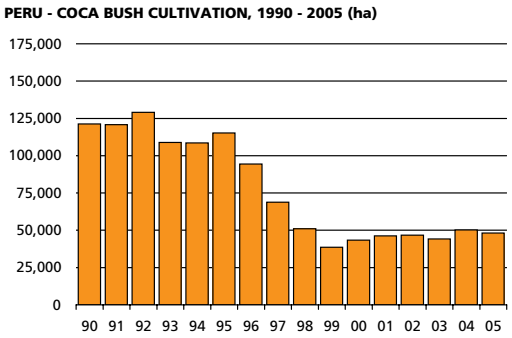


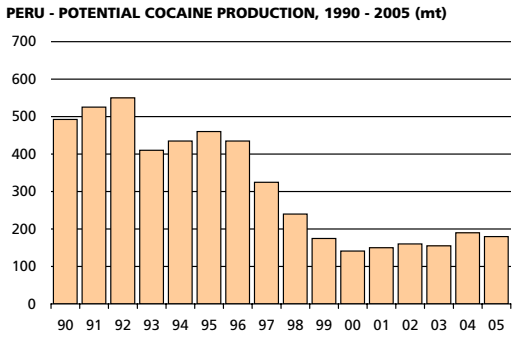
Fig. 49. Annual coca bush cultivation and cocaine production in main producing countries, 1990 - 2005

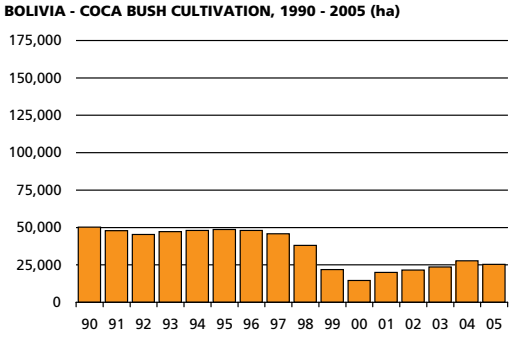




Estimates for Colombia for 1999 and subsequent years come from the national monitoring system established by the Colombian government with the support of UNODC. Due to the change of methodology, figures for 1999 and after cannot be directly compared with data from previous years. Production data for 2004 and 2005 is based on new field research in Colombia.







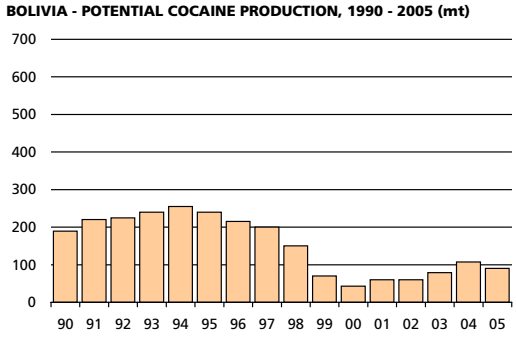


Fig. 50: Coca bush cultivation (in % of global total)

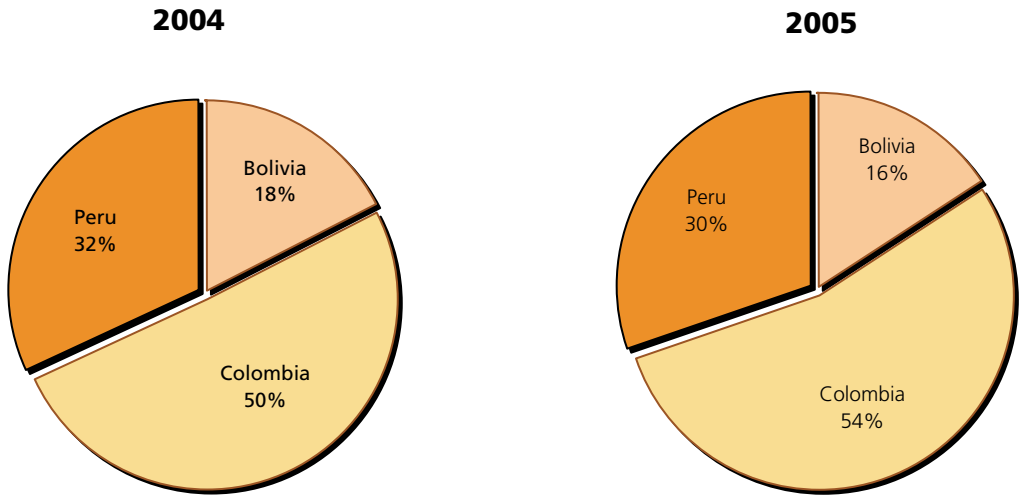


Fig. 51: Potential cocaine production (in % of global total)

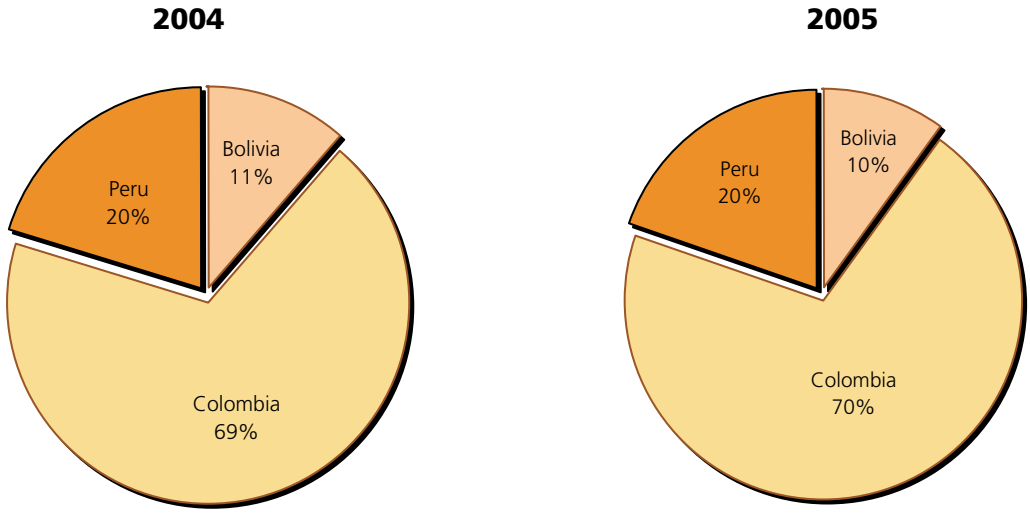


Table 8. Reported eradication of coca bush, ha

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Bolivia	1,100	5,493	7,512	7,000	11,620	15,353	7,653	9,395	11,839	10,089	8,437	6,073
Colombia	4,904	25,402	22,576	44,123	69,155	44,158	61,568	95,897	153,126	137,033	142,786	170,042
Peru			1,259	3,462	7,834	14,733	6,208	6,436	7,134	11,312	10,399	12,232

1.4.2 Trafficking

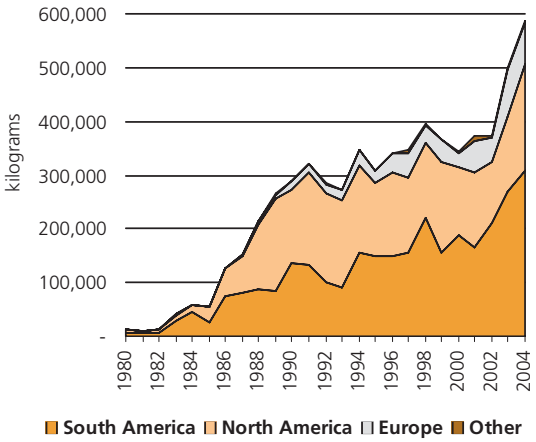
Global seizures of cocaine rose to another record high in 2004

Cocaine seizures increased, by 18 per cent, to 588 metric tons in 2004, the highest figure ever recorded. This followed an increase in global cocaine seizures of 34 per cent in 2003. The increase in cocaine seizures has been – to a large extent - the result of better cooperation among law enforcement services and improved sharing of intelligence information.

Most of the globally intercepted cocaine is seized in the Americas (86 per cent). South America accounted for 45 per cent, North America for 33 per cent and Central America & the Caribbean for 8 per cent of global seizures. The next largest market after the Americas is Europe, accounting for 13 per cent of global cocaine seizures.

For the third year in a row, Colombia topped the ranking of world cocaine seizures, with almost 188 tonnes cocaine hydrochloride (HCl) and cocaine base seized in 2004, 32 per cent of the world total and an increase of 29 per cent compared to 2003 and the highest such figure ever reported from any country. This clearly reflects the strong enforcement efforts undertaken by the Colombian authorities over the last few years. The second largest seizures took place in the United States: 166 tons or 28 per cent of the world total.

Fig. 52: Global cocaine seizures, regional breakdown, 1980-2004



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

… with the main trafficking route running from the Andean region to North America

The world's main cocaine trafficking routes continue to run from the Andean region, notably Colombia, to the United States. The trafficking patterns analysis of the Colombian authorities revealed that more than half of the country's seizures took place at the ports; with 60 per cent of the cocaine leaving the country via the Pacific coast and 40 per cent via the Atlantic coast in 2004. According to the United States Interagency Assessment of Cocaine Movement, half of the cocaine trafficked towards the United States in 2004 transited the Eastern Pacific, whereas 40 per cent were trafficked through the Western Caribbean.

The main intermediate target country of cocaine shipments from Colombia is Mexico. Mexico reports that, about 55 per cent of the cocaine is trafficked to Mexico by sea, another 30 per cent by land from Central America (Guatemala and Belize) and some 15 per cent comes by air. The direction of cocaine trafficking within Mexico is from the southern parts of the country to the northern border. In volume terms, most cocaine shipments are primarily by sea; in terms of trafficking operations, however, most cocaine deliveries are by land.

Organized crime groups from Mexico have also started to target Peru as a source country for cocaine deliveries. While in the past (until the mid 1990s), coca paste and coca base exports from Peru used to be in the hands of the Colombian drug cartels, a significant proportion of the Peruvian cocaine exports these days is organized by criminal groups from Mexico and leaves the country by sea. United States sources estimate that about 70 per cent of the cocaine hydrochloride (HCl) leaving Peru is hidden in legitimate maritime cargo. In the past most of the coca paste and coca base left Peru by air to Colombia, where it was processed into cocaine HCl.

Criminal organization of ethnic Mexican background, partly holding US passports, have supplanted Colombian criminal groups as the predominant wholesale cocaine distributors in several parts of the United States (notably the southern and mid-western regions) over the last 15 years. Between 70 and 90 per cent of the cocaine entering the United States is estimated to transit mainland Mexico or its waters according to US information. Colombian organizations still handle cultivation, production and initial offshore movement and some direct shipments to the eastern parts of the United States while Mexican organizations increasingly coordinate the remaining transportation and distribution segments required for the cocaine to reach US streets.

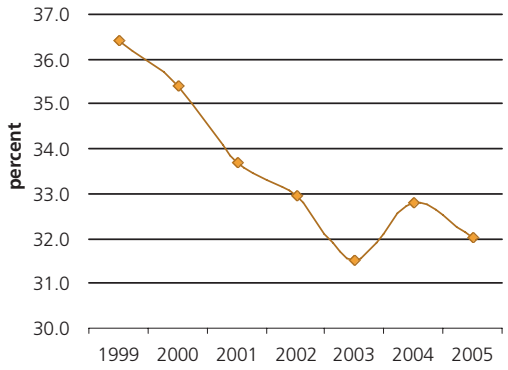
Decreasing importance of Caribbean as a transhipment point to the United States

In the past, 30-50 per cent of the cocaine entered the USA directly via the Caribbean. For 2004, however, the United States Interagency Assessment of Cocaine Movement concluded that this proportion had fallen to below 10 per cent. The main smuggling vectors via the Caribbean in 2004 concerned Haiti and the Dominican Rep (2%), Jamaica (2%) and Puerto Rico (1%).

The United States report that about 12 per cent of all cocaine entered the country by air in 2004. In contrast to the situation in the 1980s, direct shipments by air from Colombia are no longer very common.

In addition to the countries mentioned above, other countries in South America, notably Venezuela (Bolivarian Republic of) and Ecuador, serve as important transhipment points. Cocaine seizures in Venezuela (Bolivarian Republic of) were the third largest in the Americas in 2002, 2003 and 2004, amounting to 31 tons in 2004 (after Colombia,USA and ahead of Mexico). Cocaine seizures in Ecuador increased almost 9-fold, from 5 metric tons in 2004 to more than 44 tons in 2005, following, *inter alia*, the implementation of a joint UNODC/WCO container control project, confirming previous suspicions that Ecuador is used by trafficking organisations as a major cocaine outlet. Further significant cocaine seizures were reported from Ecuador in early 2006.

Fig. 53: Perceived availability of cocaine among US high school students, 1999-2005 (unweighted average of 8th, 10th and 12th grade students reporting that it is 'fairly easy' or 'very easy' to obtain cocaine powder)



Source: National Institute on Drug Abuse (United States), Monitoring the Future- National results on adolescent drug use, Overview of key findings 2005.

Strong eradication efforts in the Andean region and increased interdiction efforts in the main drug transit countries and in the United States have had an impact on cocaine availability and prices in the world's largest cocaine market. Availability of cocaine, as perceived by students in the United States, declined between 1999 and 2005. After a downward trend for many years, cocaine retail prices in the United States increased slightly in 2004 and increased by 19% over the February to September 2005 period.

Europe is second most important destination of cocaine…

The second most important destination of cocaine produced in the Andean region is Europe. In addition to Colombia, Peru and Bolivia are frequently mentioned among European countries as source countries for cocaine found on their markets.

European cocaine seizures amounted to close to 80 tons in 2004, the second highest ever reported[21] and are likely to show a new all-time high for the year 2005 at around 100 metric tons in the European Union according to Europol. The proportion of Europe in global cocaine seizures rose from 2.5 per cent in 1980 to 5.9 per cent in 1990, 8.4 per cent in 2000 and 13.5 per cent in 2004. Over the 1994-2004 period cocaine seizures in Europe increased by, on average, 10 per cent per year. Despite growing seizures, cocaine prices have not risen in Europe and no significant deterioration in the purity of cocaine was reported. Thus, the increase in seizures does not only reflect improved interdiction efforts but – unfortunately - also increased availability of cocaine on the European market.

Shipments to Spain, Europe's main entry point for cocaine, were reported to transit primarily Ecuador and Venezuela. Spain has reported Europe's largest cocaine seizures for the last twenty years and accounted for more than 40 per cent of all cocaine seizures in Europe in 2004. In terms of world cocaine seizures, it ranked third in 2004, after Colombia and the United States. About 60 per cent of the Spanish seizures were made while the cocaine was still at sea; 10 per cent were made at airports and 30 per cent on roads. Traditionally, most cocaine

21 As of 2005, seizure reports from the Netherlands show which seizures have been made in the Netherlands as such and seizures made by the Dutch authorities in and around the Netherlands Antilles. If seizures made in the Netherlands Antilles are included, overall European seizures would have remained stable in 2004 as compared to 2003. If seizures made in the Netherlands Antilles are excluded, European seizures are 10% lower than the record figure reported for 2003.

was seized along the northern Atlantic coast of Spain, notably in Galicia. Over the last two years, cocaine entered the country, in addition, increasingly via Andalusia (southern Spain). In 2005, seizure levels in Spain increased by about 50 per cent, reaching almost 50 metric tons. Large increases in cocaine seizures have also been reported from Portugal which has become another major gateway for cocaine destined for European markets. Portugal reported the third largest cocaine seizures among the European countries in 2004 after Spain and the Netherlands.

Cocaine continues to transit Caribbean on its way to Europe

One of the main cocaine trafficking route to Europe continues to go via the Caribbean region. The Netherlands Antilles are of special importance in this regard. The Dutch authorities made more than 40 per cent of their total seizures in the waters around the Netherlands Antilles in 2004[22]. Like in all years of the past two decades, seizures made by the Dutch authorities were the second largest ones in Europe, equivalent to 16 per cent of European seizures in 2004 or, including seizures made by the Dutch authorities in the Netherlands Antilles, equivalent to about a quarter of European seizures.

The United Kingdom notes that the Caribbean region, notably Jamaica, also continues to play an important role for cocaine shipments to that country. Important quantities are also trafficked via Spain and the Netherlands into the UK.

The role of the French departments in the Caribbean region as transhipment locations is less pronounced as significant amounts of cocaine enter France via Spain and the Netherlands. Nonetheless, reports received from France indicate that there are important cocaine shipments to metropolitan France transiting the Caribbean region, including the French overseas departments in the Caribbean. This seems to be particularly true for Martinique which had the fourth highest drug- related arrest figures per capita among all 100 French departments in 2004 exceeding, for instance, the corresponding rates for Paris.

Other important transit countries from the Andean region to Europe are Brazil, Suriname and, less frequently mentioned, Panama and Argentina. The Brazilian authorities estimate that about 70 per cent of the cocaine originates in Colombia, 20 per cent in Bolivia and 10 per cent in Peru. Shipments from Brazil go either directly or – increasingly – via Africa to Europe.

While most cocaine shipments from South America continue to be directed towards Western Europe (more than 99 per cent of European cocaine seizures), some shipments to Eastern Europe and the Balkan countries have been noticed by the 2005 meeting of Heads of National Law Enforcement Agency (HONLEA) on Europe, held in 2005, raising fears of the potential development of new trafficking routes and/or the incorporation of cocaine into the range of products offered by traditional heroin trafficking groups operating along the Balkan route.

Cocaine seizures in West and Central Africa show six-fold increase…

The rising importance of Africa, and notably of West and Central Africa, as a transit points for cocaine shipments destined for European markets is becoming ever more evident. Seizures made in Africa increased more than three-fold in 2004 with seizures in West and Central Africa increasing more than six-fold. West and Central Africa accounted for more than 50 per cent of all African cocaine seizures in 2004. Cocaine shipments to Africa are frequent to the countries along the Gulf of Guinea, from where the cocaine is usually trafficked in small quantities by body packers by air to various destinations in Europe. In addition, large quantities of cocaine are shipped to the waters around Cape Verde and off the coast of Senegal. Most of this cocaine is destined for Spain and Portugal (and for onward shipment to other European countries). The largest cocaine seizures over the 2000-2004 period in Africa were made in Cape Verde, followed by South Africa, Kenya, Ghana and Nigeria. More than 1 metric ton of cocaine was seized in Kenya 2004, indicating that an increasing number of countries in Africa are affected by large-scale cocaine trafficking. Out of 32 African countries reporting seizure statistics to UNODC in 2004, 23 countries or 72 per cent reported seizures of cocaine, up from just 34 per cent in 1990.

The upturn in seizures can be explained by a combination of increased trafficking and strengthened interdiction efforts. It should be noted, however, that despite this increase, African seizures still account for less than 1 per cent of global cocaine seizures and only a very

22 These seizures made in the waters around the Netherlands Antilles (13.7 tons) have been subsequently excluded from the total seizures made by the Netherlands (21.4 tons) in order to gain a more accurate picture of the geographical location of seizures.

small proportion of cocaine transiting the African continent is actually being seized.

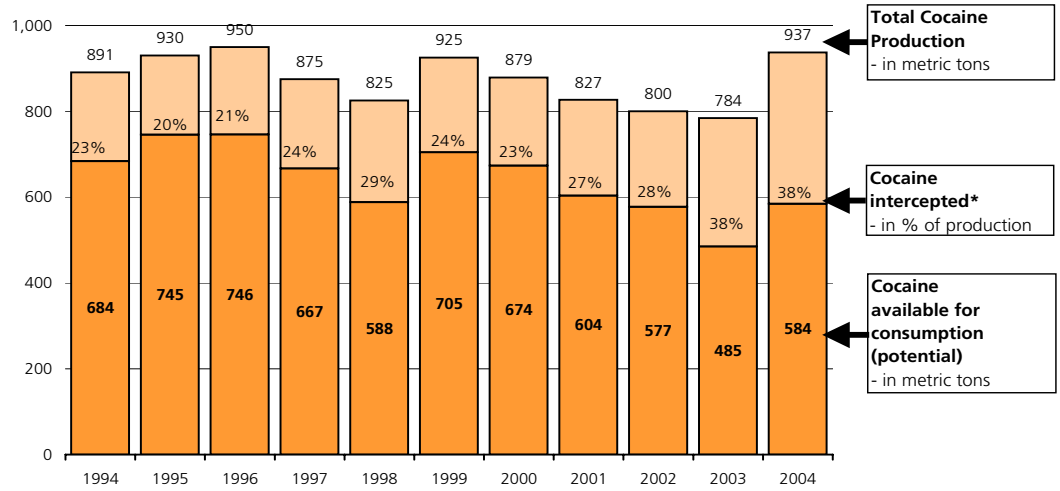
… whereas Asia and Oceania account for less than 0.1 per cent of the global total

In Asia, cocaine seizures remained essentially stable in 2004 (0.05 per cent of global total). Less than 300 kg of cocaine were seized in 2004, with the largest seizures made in Japan (88 kg) and Hong Kong SAR of China (55 kg) followed by several countries in the Near and Middle East: Syrian Arab Republic (40 kg), Jordan (32 kg), Israel (31 kg) and Lebanon (12 kg).

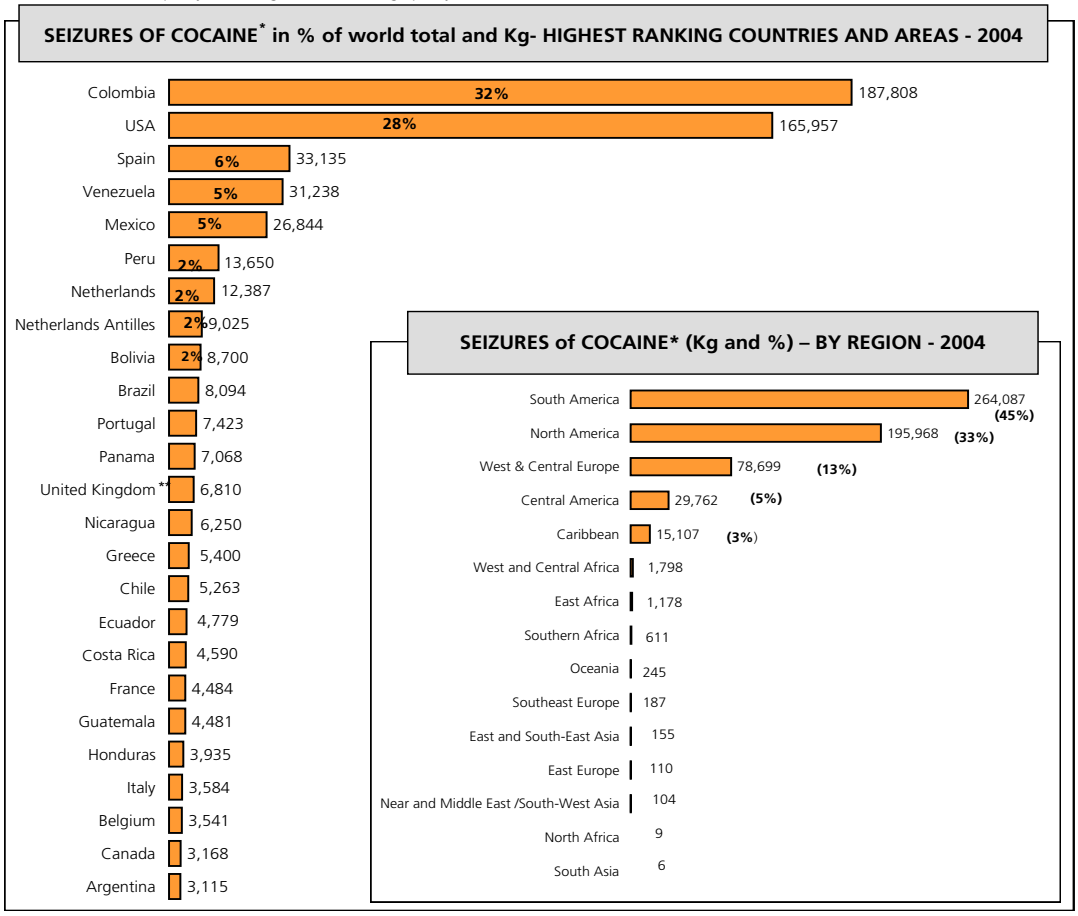
Several clandestine cocaine-manufacturing laboratories were dismantled, 4 of which were in Hong Kong SAR of China. In March 2006, authorities in China, in cooperation with the US DEA, made their largest ever cocaine seizure (135 kg), close to Hong Kong SAR of China.

Seizures in Oceania amounted to 245 kg, below 0.05 per cent of the global total. The market for cocaine in that region has remained largely stable.

Fig. 54: Global illicit supply of cocaine 1994 - 2004

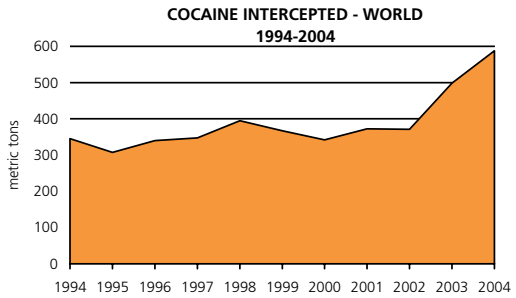


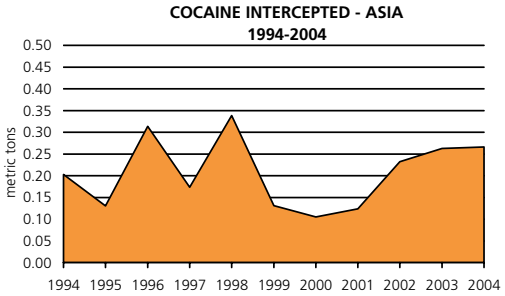
* Converted to 100% purity, assuming an actual average purity of 60%.

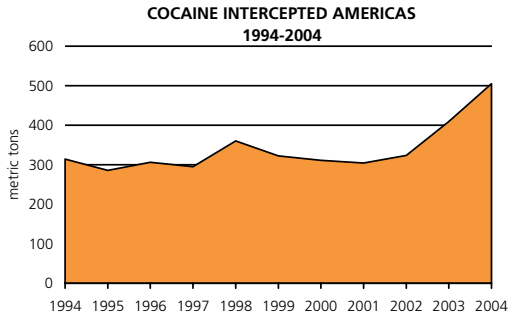


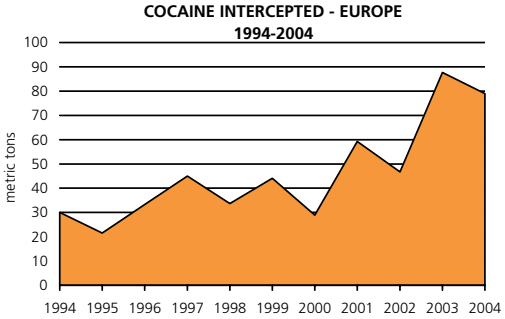
* excluding seizures in liquid form.
** data refer to 2003

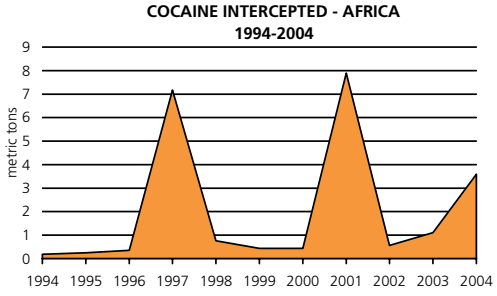
Fig. 55: Global seizures of cocaine, 1994-2004











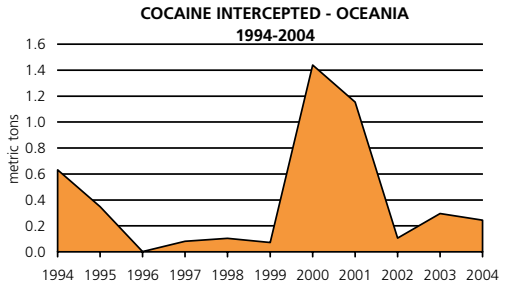
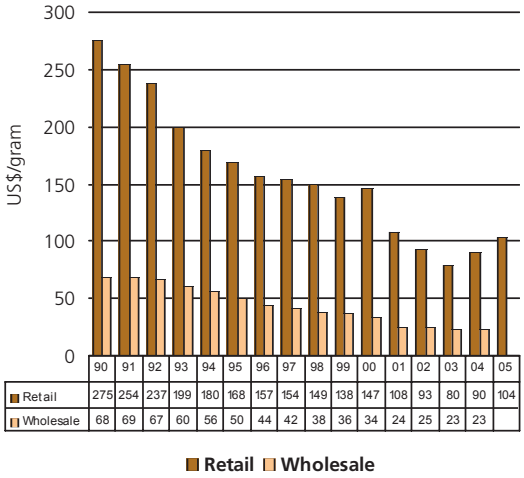
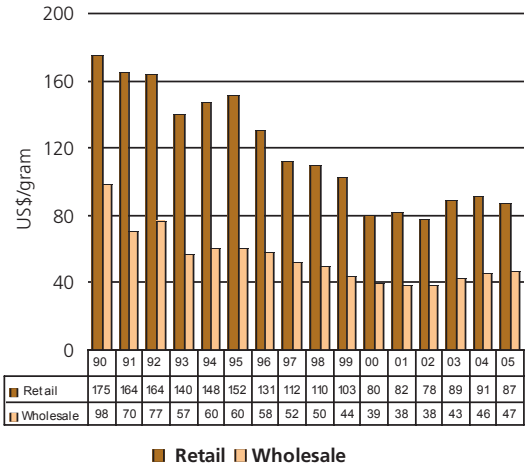


Fig. 56: USA: cocaine retail and wholesale prices, 1990-2005 (US$/gram)



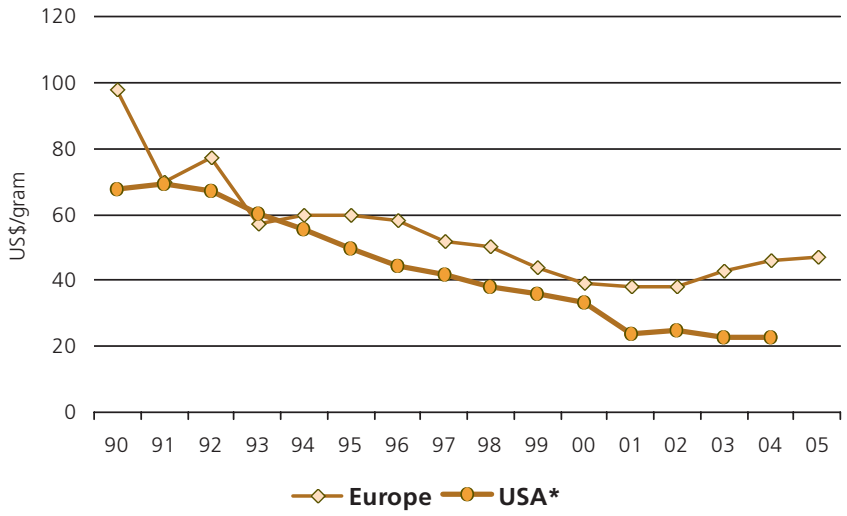
	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
Retail	275	254	237	199	180	168	157	154	149	138	147	108	93	80	90	104
Wholesale	68	69	67	60	56	50	44	42	38	36	34	24	25	23	23	

Fig. 57: Europe: cocaine retail and wholesale prices, 1990-2005 (US$/gram)



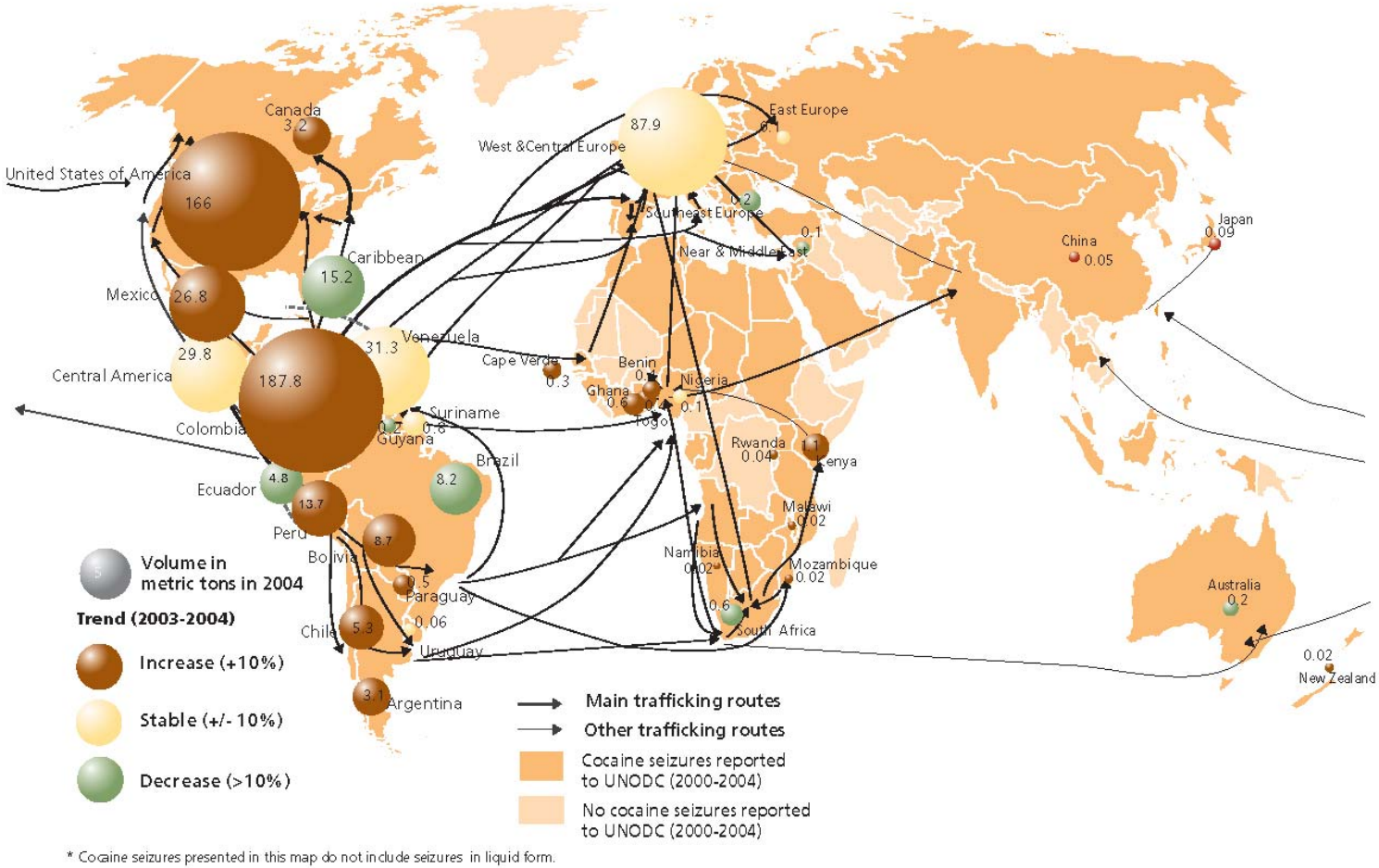
	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
Retail	175	164	164	140	148	152	131	112	110	103	80	82	78	89	91	87
Wholesale	98	70	77	57	60	60	58	52	50	44	39	38	38	43	46	47

Fig. 58: Wholesale cocaine prices in Europe and the United States (US$/gram), 1990-2005



* Data for 2005 not available

Map 11: Cocaine* seizures 2002 - 2004: extent and trends (countries reporting seizures of more than 0.01 mt (10kg.))



* Cocaine seizures presented in this map do not include seizures in liquid form.

Note: Routes shown are not necessarily documented actual routes, but are rather general indications of the directions of illicit drug flows.

1.4.3 Abuse

Most cocaine is used in North America, Western Europe and South America

Cocaine use is estimated to affect about 13.4 million people or 0.3 per cent of the population age 15-64. Most cocaine continues being used in the Americas, accounting for close to two thirds of global cocaine use. With an annual prevalence of 2.3 per cent, cocaine use is highest in North America, home to almost half of all cocaine users in the world. The single largest cocaine market worldwide, which accounts for more than 40 per cent of all cocaine users worldwide, is still the United States (2.4 per cent of those aged 12 and above in 2004 or 2.8 per cent of the population age 15-64).

The next largest markets are those of West and Central Europe (prevalence rate of 1.1 percent, on average), accounting with 3.3 million people for about a quarter of all cocaine users worldwide. Rates above average have been reported from Spain (2.7 percent), from the United Kingdom (England & Wales: 2.1 per cent and Scotland: 1.4 percent) as well as Italy (1.2 per cent). Cocaine use seems to be also rather high in the Netherlands, the second most important entry point (after Spain) for cocaine shipped to Europe. A less recent survey conducted in the Netherlands (2001) found a cocaine prevalence rate of 1.1 per cent. Cocaine use levels in the new EU member states are still substantially lower, typically ranging from 0.1 percent to 0.5 percent. The average prevalence rate of cocaine use in East Europe and South-East Europe is around 0.1 per cent, lower than in Africa (0.2 per cent).

South America (including Central America and the Caribbean) ranks third (15 per cent of the global market with an average prevalence rate of 0.7 percent of the population age 15-64, the same rate as for Europe as a whole. Countries in Oceania report slightly higher prevalence rates (0.9 per cent on average). Given differences in the part of population admitting drug use, it could well be that the actual prevalence rates in South America are higher than those in Oceania. Rates close to, or above the South American average have been reported, inter alia, in studies conducted in Bolivia (1.6 per cent for cocaine HCl and 1.9 per cent for cocaine base in 2005), Chile (1.8 per cent in 2004), Colombia (0.8 per cent in 2003), Peru (0.7 per cent in 2002) as well as in Venezuela, Ecuador and a number of

Table 9. Annual prevalence of cocaine use, 2004-2005

	Number of users	in % of population 15-64 years
EUROPE	3,524,000	0.7
West and Central Europe	3,333,000	1.1
South-East Europe	64,000	0.1
Eastern Europe	127,000	0.1
AMERICAS	8,440,000	1.5
North America	6,459,000	2.3
South America	1,981,000	0.7
ASIA	260,000	0.1
OCEANIA	175,000	0.9
AFRICA	959,000	0.2
GLOBAL	**13,358,000**	**0.3**

Cocaine abuse above global average
Cocaine abuse around global average
Cocaine abuse below global average

Sources: UNODC, Annual Reports Questionnaire data, various Govt. reports, reports of regional bodies, UNODC estimates.

Caribbean and Central American countries.

All other regions have prevalence rates below the global average. Cocaine use is still very low in most parts of Asia (average: 0.01 per cent).

Some decline of cocaine use in North Americas

Some moderate declines are found in the general population drug use data collected as part of the US National Household Survey on Drug Use and Health. Annual cocaine prevalence data for cocaine declined from 2.5 per cent of the population age 12 and above in 2003 to 2.4 per cent in 2004; crack cocaine use figures fell from 0.6 percent in 2003 to 0.5 percent. As compared to 1985 (prevalence: 5.1 percent), cocaine use declined by about 50 per cent and is at about the same level as at the beginning of the 1990s (2.6 percent in 1991). Given changes in methodology, comparisons of household survey results are, however, potentially problematic.

A better trend indicator are the high-school surveys. They show that after an increase in the first half of the 1990s, cocaine use declined in the United States among high-school students by more than 20 per cent between 1999 and 2005. Compared to data for 1985, cocaine use among high-school students is now more than 60 per cent lower.

Similarly to these trends, data for the province of Ontario, home to more than a third of Canada's total population, showed an upward trend of cocaine use in the 1990s. This lasted until 2003. Between 2003 and 2005, however, cocaine use among Canadian high school students fell by almost 18 per cent and is now slightly below the levels reported 20 years ago.

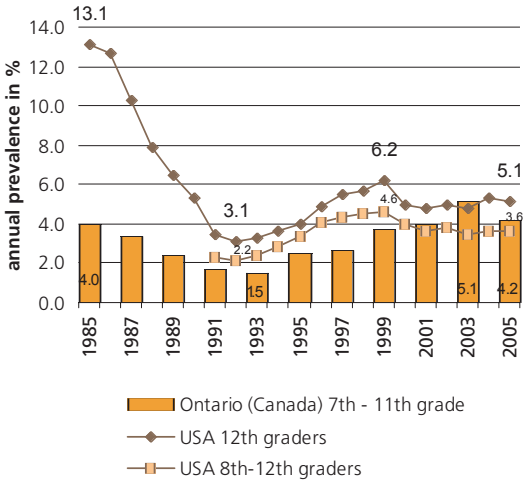
… and mixed trend patterns in South America

Survey data reported from Colombia show that life-time prevalence of cocaine use increased over the 1996-2004 period (from 1.5 per cent in 1992 and 1.6 per cent in 1996 to 3.7 percent in 2004). There are indications, however, that the increase took place in the late 1990s. Life-time prevalence of cocaine use among youth, aged 10-24, was in 2001 more than 5 times higher than in 1996. A comparison of annual prevalence estimates, derived from these studies, with actual annual prevalence data from the new national survey, suggests that cocaine use prevalence (including basuco) has actually declined over the 2001-2004 period.

Following increases in the 1990s, declines in overall cocaine use have also been reported from Chile. Annual prevalence of cocaine use among the general population declined from 1.9 per cent in 2000 to 1.7 per cent in 2004. If only cocaine HCl is considered, the decline was from 1.5 per cent in 2000 and 2002 to 1.3 per cent in 2004.

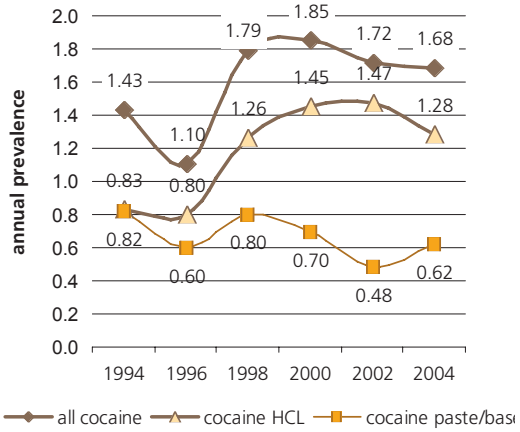
Student surveys conducted in Brazil suggest that cocaine use, after having grown strongly between 1987 and 1997, remained essentially stable over the 1997-2004 period.

Fig. 59: Cocaine use among high school students in the USA and in Ontario (Canada)



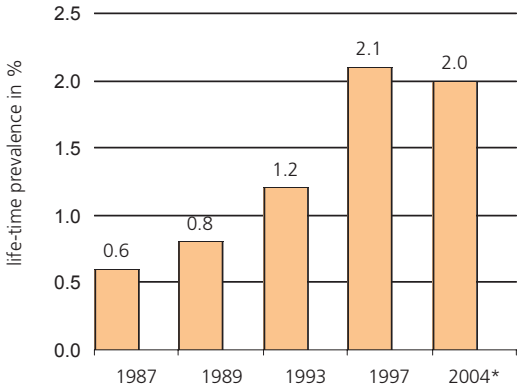
Sources: NIDA, Monitoring the Future - Overview of Key Findings 2005 and CAMH, Drug Use Among Ontario Students, 2005.

Fig. 60: Cocaine use among the general population in Chile (age 12 – 64)



Source: CONACE, Sexto Estudio Nacional de Drogas en Población General de Chile, 2004.

Fig. 61: Life-time prevalence of cocaine use among Brazilian students, age 10-18



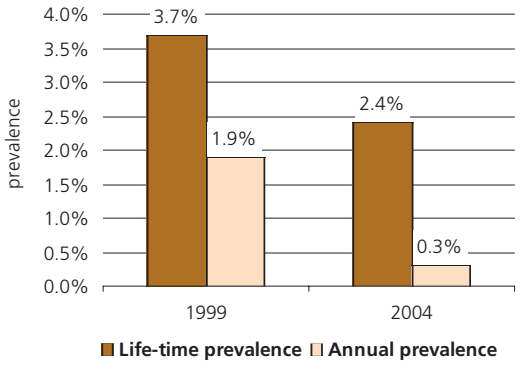
* unweighted average of results in 10 provincial cities

Source: CEBRID, Levantamento Nacional Sobre o Uso de Drogas Psicotrópicas entre Estudantes do Ensino Fundamental e Médio da Rede Pública de Ensino nas 27 Capitais Brasileiras, 2004

Data provided by Argentina even shows a massive decline in cocaine use between 1999-2004. Even though some of the decline may be due to methodological differences in the two surveys, it would be extremely unlikely that cocaine consumption, in reality, had increased. The Argentine authorities, however, did not see the decline in 2004 and based on other indicators reported an overall stable trend.

All of these encouraging trends are probably associated with both intensified prevention efforts in the countries concerned as well as with the overall stabilization of cocaine production in the Andean countries over the past few years.

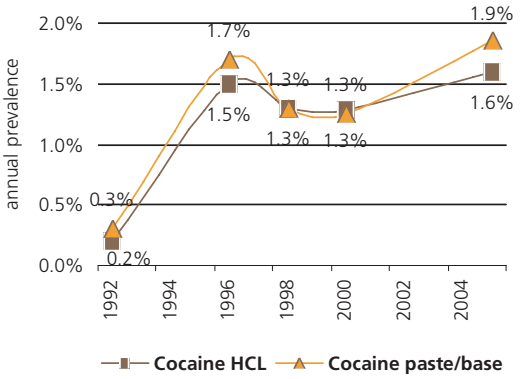
Fig. 62: Cocaine use in Argentina among the general population (16-65), 1999-2004



Source: UNODC, Annual Reports Questionnaire Data.

Data for Bolivia are not really an exception of these explanations, even though they show a slightly different pattern. Following strong increases in the early 1990s until 1996, cocaine prevalence rates declined and started increasing again only over the 2000-2005 period. The abuse trend is largely in line with domestic cocaine production.

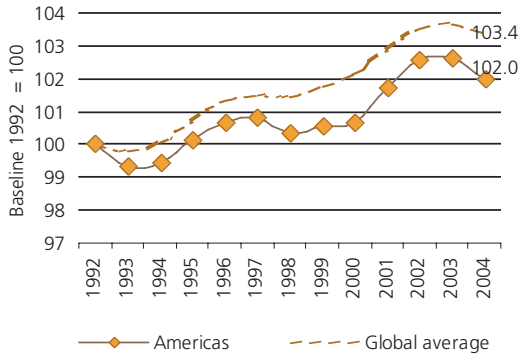
Fig. 63: Annual prevalence of cocaine use in Bolivia (age 12-50), 1992-2005



Source: CELIN, Investigación: Estudio Comparativo Consumo de Alcohol, Tabaco, Cocaína, y otras Drogas en Bolivia, 1992-1996-1998-2000-2005, Bolivia 2005.

The net result of these trends was an increase of cocaine use over the last decade in the Americas that was below the global average. In 2004, cocaine use was perceived by experts as declining.

Fig. 64: Cocaine use perception trends: Americas



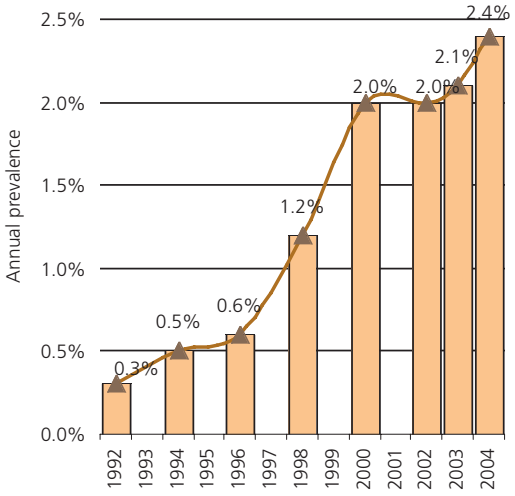
Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Cocaine use in Europe is heading upwards

Cocaine use levels in Europe have clearly shown upwards over the last decade, including in England & Wales and Spain, the countries with the highest cocaine prevalence rates in Europe. Annual prevalence of cocaine use in Spain rose from 1.6 per cent of the population age 15-64 in 1997 to 2.7 per cent in 2003. Germany experienced an increase in cocaine use from 0.2 per cent in 1990 to 1 per cent of the population age 18-64 in 2003. Data for England and Wales show an increase in cocaine prevalence from 0.3 per cent in 1992 to 2.4 per cent in 2004. For England and Wales, however, indications are that a peak may have been reached.

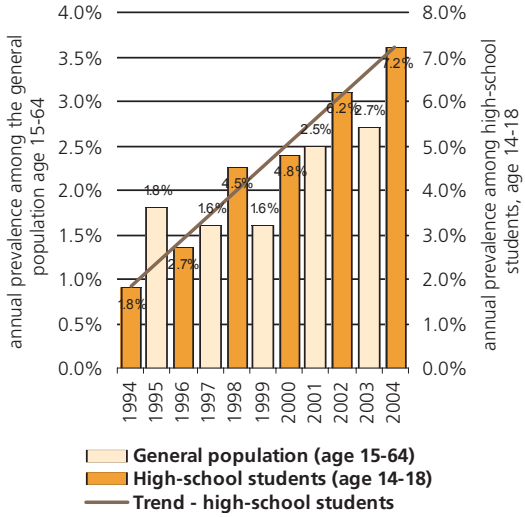
These increases are also reflected in cocaine use perception trends which has shown upwards for Europe over the last decade, including 2004. No deceleration in the upward trend was noticed in 2004.

Fig. 66: England & Wales: annual prevalence of cocaine use among the general population (age 16-59), 1991/92 - 2003/04



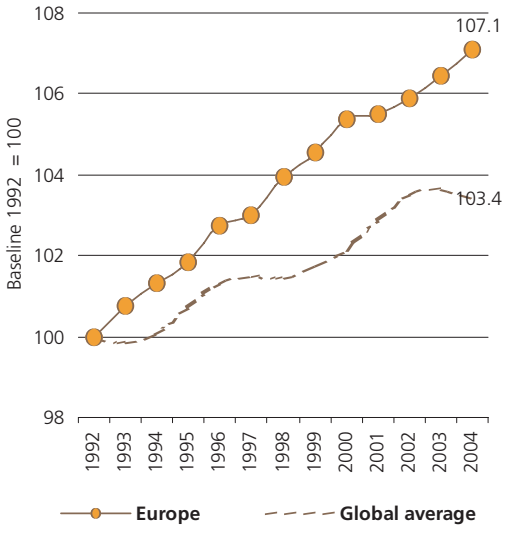
Source: UK Home Office, British Crime Survey.

Fig. 65: Annual prevalence of cocaine use in Spain among the general population and among secondary school students, 1994-2004



Source: Ministerio de Sanidad y Consumo, Plan Nacional Sobre Drogas

Fig. 67: Cocaine use perception trends: Europe



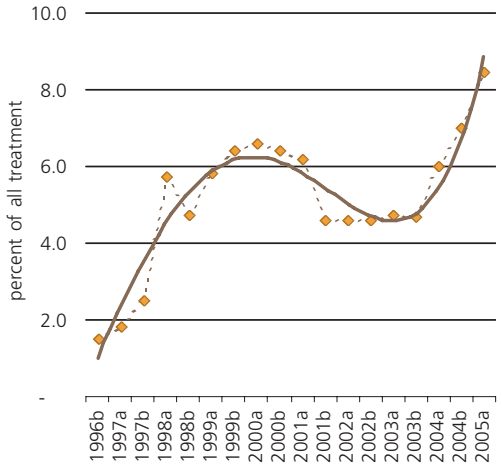
Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Cocaine use is increasing in Africa

UNODC's perception trends suggest that cocaine use was also growing faster in Africa than at the global level over the 1992-2004 period, and cocaine use was apparently increasing again in 2004 following a few years of stabilization/decline. The reported increases in cocaine use were mainly from countries in southern Africa and countries in western Africa, reflecting, inter alia, the increased use of Africa for the transhipment of cocaine to Europe.

Treatment data for South Africa show these trend patterns very clearly. Following very little cocaine related problems in the early 1990s to the mid 1990s, treatment for cocaine increased from 1.5 per cent of all treatment demand in the second half of 1996 to around 6 per cent over the 1999-2000 period, then falling to less than 5 per cent over the 2001-2004 period before rising again strongly to 7.5 per cent in 2004 and 8.5 per cent in the first two quarters of 2005. The absolute numbers of people treated for cocaine abuse in South Africa followed a similar pattern as shown in the graph below. Excluding alcohol, the increase in cocaine was from 7 per cent in the second half of 1996 to 16 per cent of treatment demand in the first two quarters of 2005.

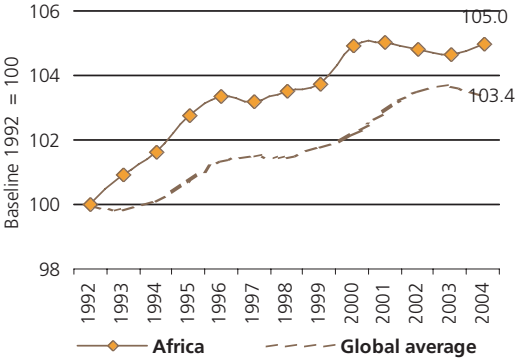
Fig. 68: South Africa - cocaine as primary drug in treatment demand*



* unweighted average of treatment (incl. alcohol) in 6 provinces.

Source: SACENDU, Research Brief, Vol. 8 (2), 1995.

Fig. 69: Cocaine use perception trends: Africa



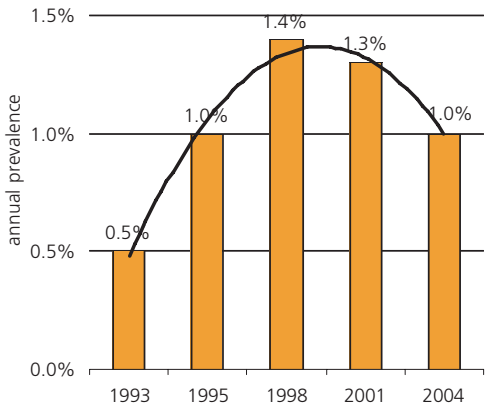
Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Cocaine use is largely stable in Asia and declining in Oceania

Following increases reported over the 1997-2000 period, cocaine use remained stable in the subsequent years and was reported to have declined in 2004 in Oceania. The overall increase since 1992 appears to have been less than at the global level.

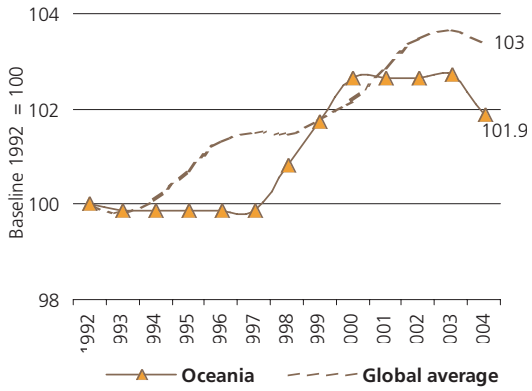
These trends are also reflected in the household surveys conducted by the Australian authorities.

Fig. 70: Cocaine use in Australia, 1993-2004 (population 14 years and above)



Source: AIHW, 2004 National Drug Strategy Household Survey, Canberra, April 2005.

Fig. 71: Twelve year cocaine use, as perceived by experts: Oceania

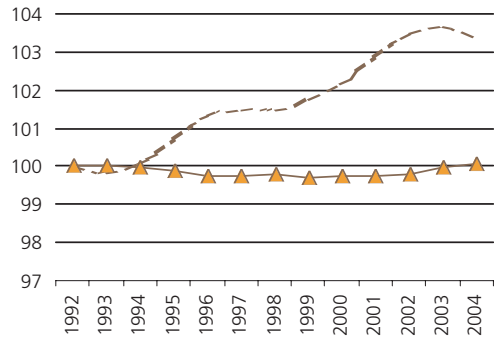


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Stable trend of (very limited) cocaine use in Asia – but some early indications that this could change

Cocaine use in Asia has been stable and hardly been noticeable at all over the last decade. However, there are some early indications that this might change in the foreseeable future. In 2005 and 2006 limited but rising amounts of cocaine were trafficked to some countries and areas in South-East Asia including Hong Kong SAR of China and China, and reports of the dismantling of some organized crime networks dealing in cocaine were received.

Fig. 72: Twelve year cocaine use, as perceived by experts: Asia

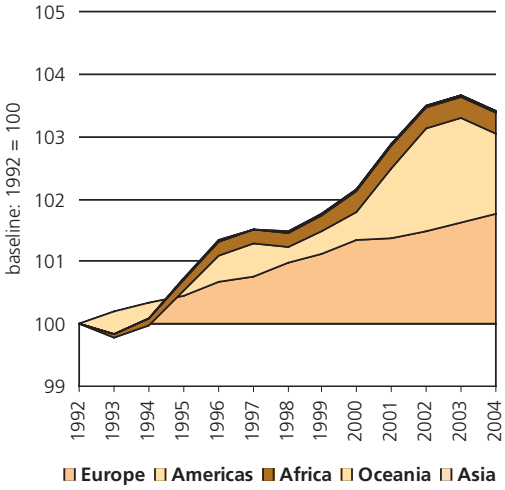


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Overall increase of drug use perception indicator mainly due to rising cocaine use in Europe

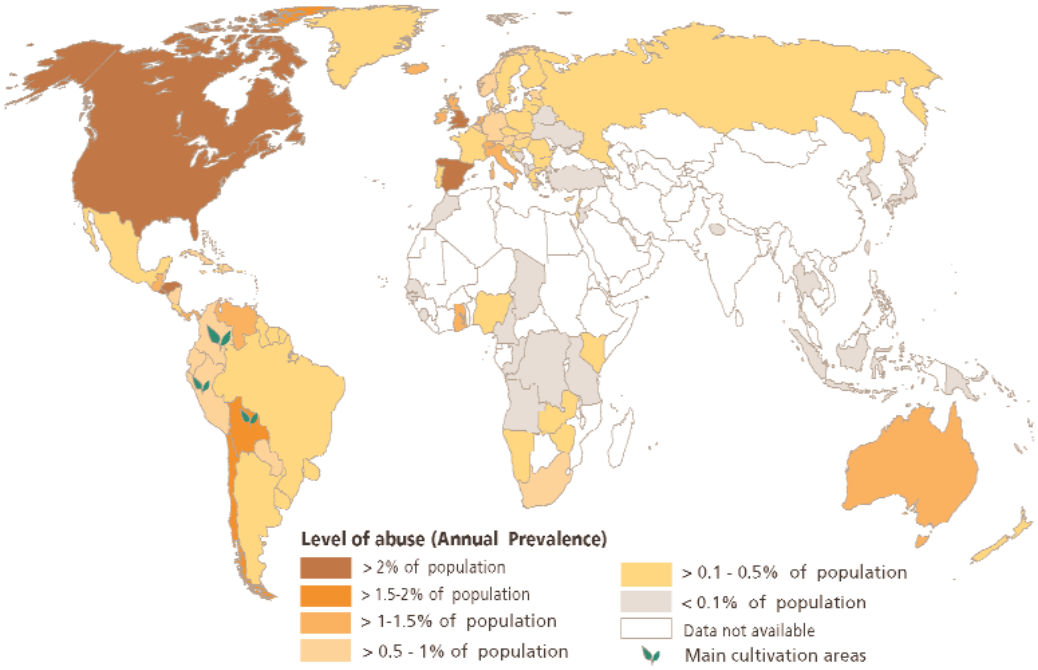
Aggregating the various regional perception trends into the overall drug use perception indicator by region shows that Europe primarily fuelled the upward trend of this indicator over the last decade, followed by the Americas (mainly countries of South America, the Caribbean and Central America). In 2004, the perceptions of rising levels of cocaine use gave way to reports of stabilization or decline in a number of American countries, thus prompting the overall cocaine use perception indicator to decline while the upward trend in Europe continued unabated.

Fig. 73: Twelve year cocaine use, as perceived by experts: overall trend

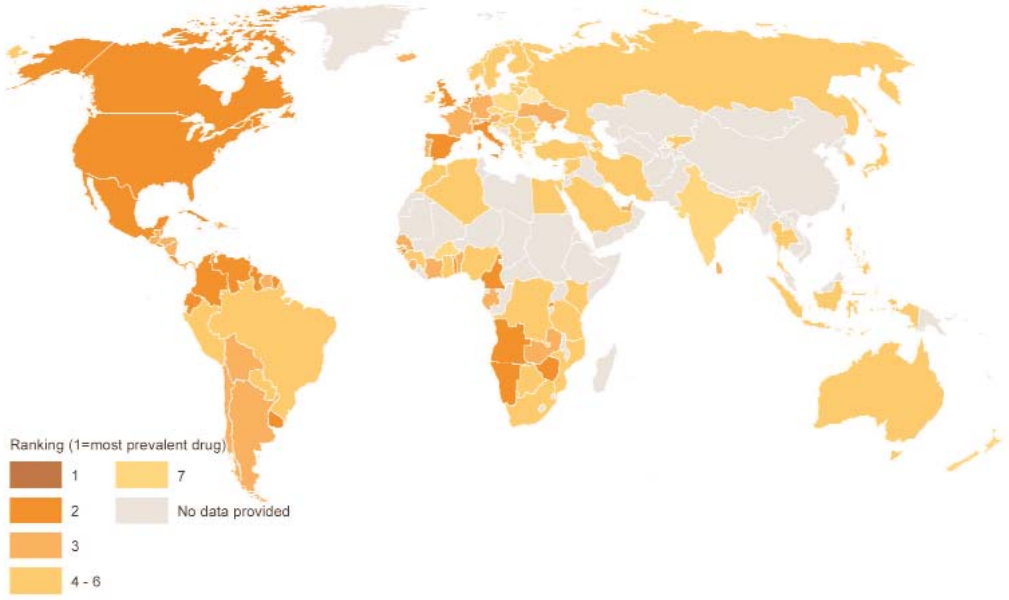


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Map 12: Use of cocaine 2003 - 2005 (or latest year available)

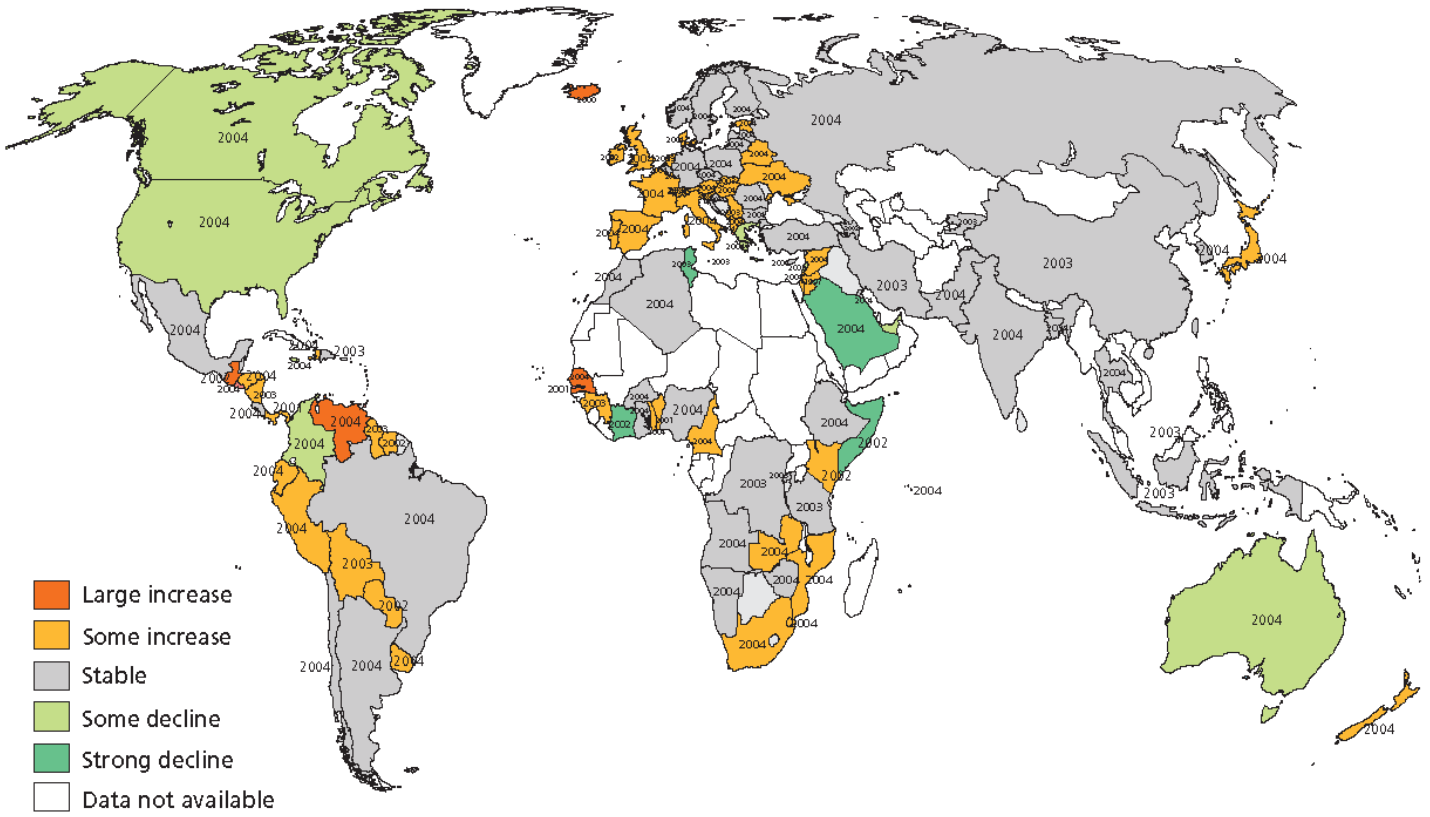


Map 13: Ranking of cocaine in order of prevalence in 2004



Sources: UNODC Annual Reports Questionnaires data, SAMSHA US National Household Survey on Drug Abuse, Iranian Ministry of Health, Rapid Assessement Study and UNODC ARQ,Council of Europe, ESPAD.

Map 14: Changes in consumption of cocaine, 2004 (or latest year available)



Sources: UNODC Annual Reports Questionnaires data, UNODC (Regional Centre Bangkok) Epidemiology Trends in Drug Trends in Asia (Findings of the Asian Multicity Epidemiology Workgroup), December 1999, National Household Surveys submitted to UNODC, United States Department of State (Bureau for International Narcotics and Law Enforcement Affairs) International Narcotics Control Strategy Report, 1999;Bundeskriminalamt (BKA) and other Law Enforcement Reports, SACENDU (South African Community Epidemiology Network) July - December 1998,UNODC and Ministerio de Educacion,Estudio Epidemiologico 1999, CEDRO, Epidemiologia de Drogas en la poblacion urbana Peruana - 1995, INCB, Annual Report for 1999, CEBRID, Levantamento National Sobre o Consumo de Drogas Psicotrópicas Entre Estudantes de Ensino Fundamental e Médio da Rede Pública de Ensino nas 27 capitaís Brasileiras, 2004.

1.5 Cannabis market

1.5.1 Production

Production of cannabis basically comprises three different products: cannabis herb, cannabis resin and cannabis oil.

- **Cannabis herb** is comprised of the flowering tops and leaves of the plant, which are smoked like tobacco using a variety of techniques. While this drug is consumed throughout the world, the largest market for cannabis herb is in the Americas, accounting more than 60 per cent of global seizures in 2004. North America alone was responsible for more than half of all seizures. Africa accounted for more than 30 per cent of global cannabis herb seizures. Over the 1994-2004 period, the proportion of cannabis herb seizures in global cannabis seizures amounted to 79 per cent (81 per cent in 2004)

- **Cannabis resin** (*hashish*) consists of the secretions of the plant emitted in the flowering phase of its development. Nineteen per cent of global cannabis seizures were in the form of cannabis resin in 2004. Western Europe is the largest market for cannabis resin, accounting for more than 70 per cent of global resin seizures in 2004, and some 80 per cent of the hashish consumed in Europe is estimated to be produced in Morocco.

- **Cannabis oil** (*hashish* oil) is far less widely used than cannabis herb or cannabis resin. Although cannabis oil seizures doubled in 2004, they accounted still for just 0.01 per cent of global cannabis seizures in 2004.

Production estimates for cannabis are collected by UNODC, but must be regarded with a high degree of caution. They are highly tentative and should be viewed as informed guesses established by experts. As scientifically valid monitoring systems for cannabis cultivation continue to be the exception and not the rule, even major producing countries are not in a position to provide scientifically valid estimates.

Moreover, the fact that cannabis is a plant that grows in virtually every inhabited region of the world, that can be cultivated with little maintenance on small plots, and that can even be grown indoors, further complicates matters. Therefore, remote sensing approaches in estimating the areas under cultivation, as used for poppy and coca, are difficult if not impossible if global cultivation had to be estimated.

In other words, the lack of clear geographical concentrations in a few countries (as is the case for opium poppy or cocaine) has made it difficult to introduce effective and reliable crop monitoring systems for the world at large.

Cannabis herb is cultivated in some 176 countries

Over the 1994-2004 period, 82 countries provided UNODC with cannabis production estimates. For comparison, only 36 countries provided estimates for opium poppy cultivation, and only six provided estimates for coca leaf production.

The fact that a country did not provide an estimate does not mean that no cultivation exists, as many countries lack the capacity to establish reliable estimates. Another possibility to identify cannabis producing countries has been to analyse reports on the source of the cannabis trafficked in a country. On this basis, 142 producer countries could be identified for the 1994-2004 period.

A third list of producer countries was generated by singling out those that report the seizure of whole cannabis plants. It is inefficient and thus unlikely to transport whole plants internationally, as only certain parts are

useable as a drug. Thus, when a whole plant is seized, it is very likely that it was locally produced. Seizures of whole cannabis plants were reported in 141 countries during the 1994-2004 period.

Combining these three lists results in the identification of 176 countries and territories where cannabis is produced. This is equivalent to 90 per cent of the countries and territories which receive UNODC's Annual Reports Questionnaire (195). However, there are no indications that in the remaining countries cannabis production does not take place.

Global production of cannabis is estimated at 45,000 metric tons

Since the publication of the 2005 *World Drug Report*, there has been a slight increase in the global cannabis production estimate, from 42,000 metric tons to 45,000 metric tons. A tentative breakdown of these estimates shows that the bulk of cannabis continues to be produced in the Americas (54 per cent), notably in North America (35 per cent), in South America (18 per cent), Africa (27 per cent) and Asia (15 per cent). Only 4 per cent of global cannabis herb production occurs in Europe. This may appear low, however, it should be noted that Europe also accounts for just three per cent of global cannabis herb seizures. Oceania accounts for 1 per cent of global production.

Production of herbal cannabis in North America appears to decline

A number of indicators suggest that the Americas, and notably North America, produce more cannabis than any other region. The cannabis markets in the Americas are, however, largely self-sufficient, that is, most of the cannabis produced in the Americas is also consumed in the region.

According to United States estimates, 10,100 metric tons of cannabis herb were produced in Mexico in 2005. This would make Mexico the largest cannabis herb producer in North America. In the United States, about 4,455 metric tons of cannabis herb were produced in 2004/5, according to the United States Office of National Drug Control Policy. An estimated 800 metric tons of cannabis herb are produced in Canada.
Cannabis herb production in that region appears to have declined. In Mexico, production of cannabis herb is said to have decreased from 13,500 metric tons in 2003 to 10,100 metric tons in 2005 (-25 per cent). This success was largely due to large-scale eradication efforts. Similarly, in the United States production has been reduced from some 5,560 metric tons to 4,455 metric tons.

Cannabis production significantly increases in Paraguay

The UNODC estimate for cannabis production in Paraguay was raised from 2,000 to slightly less than 6,000 metric tons[23], a three-fold increase. However, the growth reported from Paraguay was even more dramatic, suggesting an annual production of some 15,000 metric tons of cannabis. The upsurge was explained by an increase in the cultivation area and the introduction of new species which allow for cannabis cultivation in the dry winter months, thus leading to higher yields.

However, the reported estimate did not tally with credible information that 85 per cent of Paraguayan cannabis resin (equivalent to 12,750 metric tons) is destined for cannabis markets in Brazil. Given the official estimates of cannabis users in Brazil (1 per cent of the population age 15-64 or 1.2 million persons), each user would have had to consume 10.5 kg of cannabis per year which is far in excess of the usual figures for annual use (100-250 grams per user). Absorption capacity in other South American countries is limited and no information has emerged so far from Paraguay conquering markets outside South America. Therefore, taking all these factors into consideration, the estimate for cannabis production in Paraguay was raised more conservatively.

Production also on the rise in Africa and Asia

Other major producing countries of cannabis herb are – according to UNODC estimates – Morocco (3,700 metric tons)[24], South Africa (2,200 metric tons), Colombia (2,000 metric tons) and Nigeria (2,000 metric tons). Further important producer countries are

23 This would be equivalent to either the new estimate of 3000 hectares and the old yield of 1960 kg/ha or the old area under cultivation estimate (1,100 ha) and the new yield estimates of more than 5000 kg/ha per year .

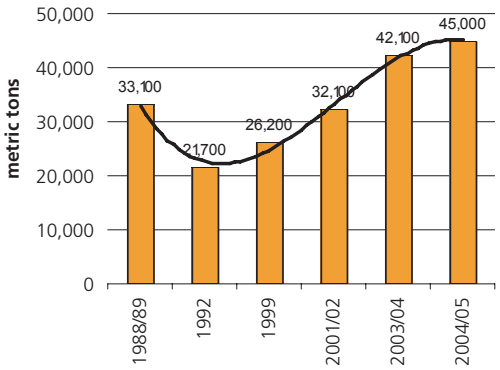
24 The estimate of cannabis herb production of Morocco was established on the basis of the cannabis cultivation survey carried out by the Government of Morocco, in collaboration with UNODC, and seizure data providing an indication of the likely split of cannabis resin and cannabis herb production. Taking the typical cannabis-to-cannabis-resin transformation ratios into account, seizure data suggest that less than 5 per cent of the land under cannabis cultivation in Morocco is dedicated to cannabis herb production. Based on these ratios, the total area under cannabis herb cultivation was estimated at 4,500 hectares in 2004. Using the average yield in Morocco (813 kg in 2004) resulted in an estimate of 3,660 metric tons of cannabis herb production in Morocco.

Kazakhstan, Philippines, Egypt, Lebanon, Canada, India, Sri Lanka, Kyrgyzstan, Afghanistan, Albania and Netherlands, with an estimated production ranging between 300 and 1,600 metric tons per country.

In Africa, cannabis production shows an upward trend, except for Morocco where production has declined sharply. A number of Asian countries also reported higher production estimates.

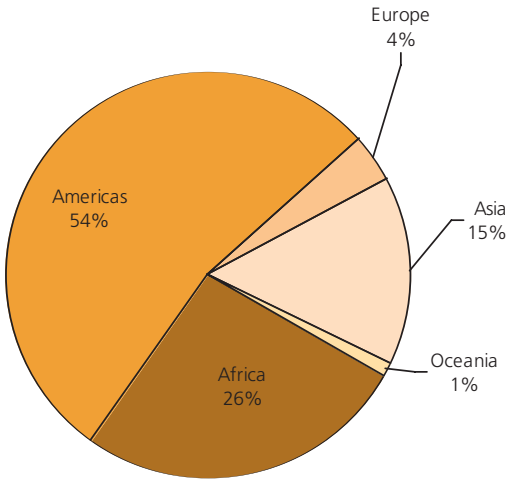
Although the changes at the global level have not been dramatic over the past two years, current production estimates are substantially higher than those for the early 1990s. After having fallen in the late 1980s, global cannabis production seems to be now more than twice as high as a decade earlier. The trend in production is in line with seizure data.

Fig. 75: Estimates of global cannabis herb production[25]



Sources: UNODC, World Drug Reports 2004 and 2005, UNODC, Annual Reports Questionnaire Data, Government Reports and UNODC estimates.

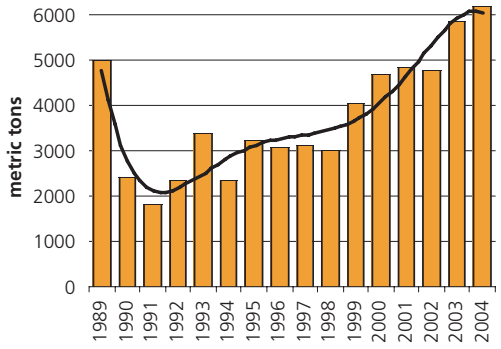
Fig. 74: Distribution of cannabis herb production in 2004/05 (N = 45,000 metric tons)



Source: UNODC, Annual Reports Questionnaire Data/DELTA.

25 The very strong increase between 2001/02 and 2003/04 is due to an expansion of country estimates (applying consumption based production estimates for countries which did not supply such estimates); without that methodological change, the increase would have only been from 32,000 to 35,000 metric tons.

Fig. 76: Cannabis herb seizures, 1999-2004



Source: UNODC, Annual Reports Questionnaire Data.

Cannabis resin

Morocco continues to be a major source of cannabis resin

The world's largest cannabis resin producer continues to be Morocco, supplying illicit markets in North Africa and West Europe. West Europe is the world's largest market for cannabis resin, accounting for more than 70 per cent of global resin seizures in 2004.

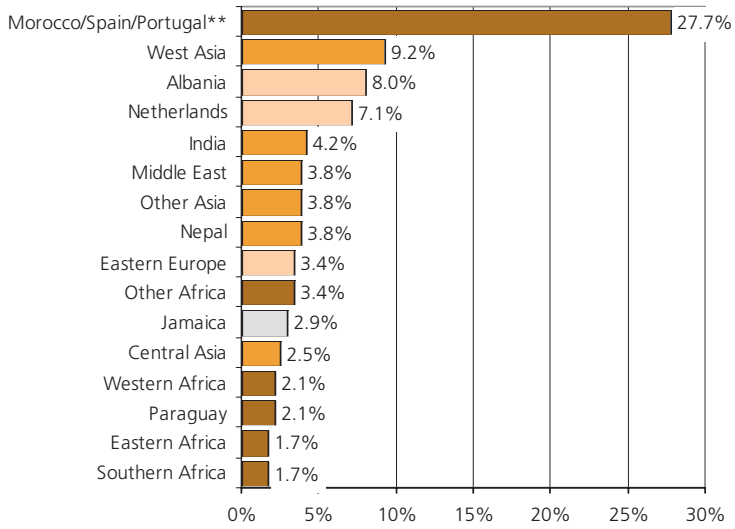
Over the 2002-2004 period, Member States cited Morocco as source country, followed by Pakistan and Afghanistan. The proportion of Morocco has, however, declined slightly, from 31 per cent over 1999-2003[vi] to 28 per cent over the 2002-2004 period, suggesting that the source basis for supplying the cannabis resin market is expanding to a number of other countries.

Other countries cited as important sources of cannabis resin are Albania and the Netherlands. In some cases, it is not always clear whether the cannabis resin was produced in these countries or whether it was only bought in these countries, originating from Morocco. Jamaica and Paraguay are said to be key sources of cannabis resin in the Americas.

Cannabis resin production plummets in Morocco

Since 2003, the Government of Morocco has conducted comprehensive cannabis surveys, in cooperation with UNODC. The 2003 survey placed total resin production at about 3,060 metric tons, cultivated on 134,000 hectares of land in the Rif region by some 96,600 families. The 2004 survey showed a 10 per cent decline in the land dedicated to cannabis cultivation (120,500 hectares), with an estimated production of 2,760 metric tons. The 2005 survey found a further 40 per cent decline to 72,500 hectares and a decline in production to 1,066 metric tons, clearly reflecting the intensified efforts of the Moroccan authorities to eliminate

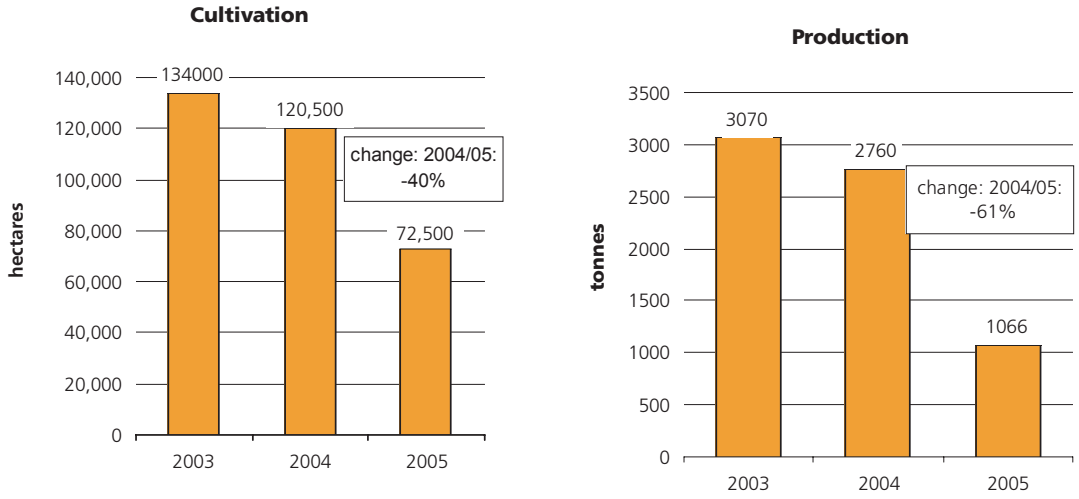
Fig. 77: Countries and sub-regions most frequently cited as sources of cannabis resin, 2002-2004 (based on information from 64 countries)*



* number of times countries were identified as source countries, as a proportion of countries reporting.
** shown together as they lie along the same trafficking route.

Source: UNODC, Annual Reports Questionnaire Data.

Fig. 78: Morocco - cannabis cultivation and production, 2003-2005



Source: UNODC, Annual Reports Questionnaire Data.

Table 10: Tentative estimates of global cannabis resin production, 2004

	Seizures in metric tons (2004)	Estimated proportion of seizures related to cannabis resin originating in Morocco	Potential seizures in metric tons related to Moroccan cannabis resin in 2004	Cannabis resin production estimates
West & Central Europe	1,083.00	80%	866.4	
North Africa	103.4	90%	93	
Seizures related to Moroccan cannabis resin			959.4	
Global seizures			1,470.50	
Seizures related to Moroccan cannabis resin in % of global seizures			65%	
Cannabis resin production in Morocco (2004) in metric tons				2,760
1. Estimate of global cannabis resin production (based on Moroccan cannabis resin production)				4,230
2. Estimate based on cannabis herb production estimates and seizures				
	Cannabis herb	Cannabis resin	Proportion	Cannabis resin production estimates
Seizures in metric tons (2004)	6,189.30	1,470.50	24%	
2. Cannabis production estimate (based on herb production estimate)	45,000		24%	10,692
3. Combined estimate				
Average of estimates 1 and 2				7,461
3. UNODC cannabis resin production, rounded (Range)				7,500 (4,200-10,700)

cannabis production from their territory.

The decline of Moroccan cannabis production in 2004 (-10 per cent) was, however, not sufficient to reduce global cannabis resin production in that year. Cannabis resin seizures and consumption estimates suggest that the long-term upward trend in cannabis resin production did not come to a halt in 2004.

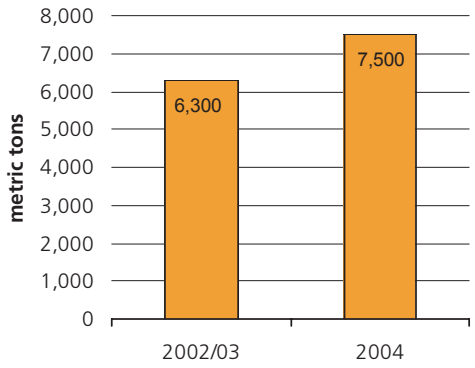
Tentative estimates, extrapolating results from Moroccan cannabis resin production data and extrapolating global resin production from herb production estimates with the help of seizure statistics, suggest that some 7,500 metric tons of cannabis resin were produced in 2004 (range: 4,200-10,700). Previous estimates, based on the same methodology, resulted in an estimate of some 6,300 metric tons (range: 5,100-7,400) for the year 2002/03.

No global production estimates for 2005 are, as yet, available. One can assume, however, that the strong decline of cannabis resin production by some 1700 metric tons in Morocco has had an impact on global cannabis production, leading to some decline of global cannabis resin production in 2005.

A tentative breakdown of global cannabis resin production suggests that some 40 per cent of the global cannabis resin supply is being produced in North Africa and more than a quarter in the Near and Middle East.

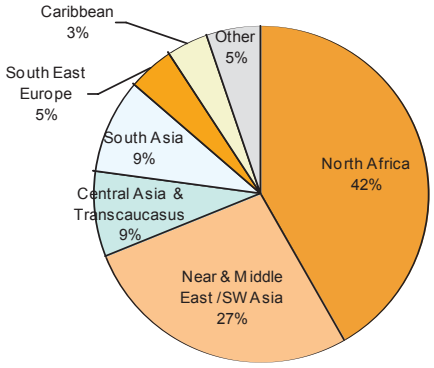
These two regions account for more than two thirds of global cannabis resin production. Other cannabis resin producing regions of importance are Central Asia, South Asia and, to a lesser extent, South-East Europe and the Caribbean.

Fig. 79: Tentative global cannabis resin production estimates, 2002/3 and 2004



Sources: UNODC, World Drug Report 2004 and UNODC and Government of Morocco, Cannabis Survey 2003 and 2004; UNODC, Annual Reports Questionnaire Data.

Fig. 80: Distribution of global cannabis resin production (N = 7,500 tons in 2004)



Source: UNODC, Annual Reports Questionnaire data.

1.5.2 Trafficking

Trafficking of both cannabis herb and cannabis resin continues to increase

Cannabis herb and resin remain the most widely trafficked drugs worldwide, accounting for the majority of all seizures. Almost all countries in the world are affected by cannabis trafficking. The upward trend in cannabis seizures, which began in the early 1990s, continued in 2004.

Cannabis herb seizures surpassed the 6,000 metric ton mark (+6 percent) in 2004. Most cannabis herb seizures were reported from Mexico, followed by the United States, South Africa, Nigeria and Morocco. In 2004, seizures of cannabis resin also increased by 6 percent to 1,470 metric tons. Most seizures of cannabis resin were made by Spain, followed by Pakistan, France, Morocco, Iran.

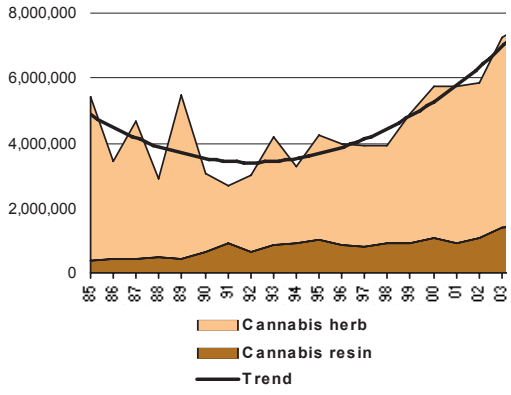
Cannabis herb remains, by far, the most widely trafficked drug

In terms of both volume and geographic spread, cannabis herb is the most intercepted drug in the world. Cannabis herb seizures rose by 6 per cent in 2004 and have doubled over the past ten years.

More than half of the global total of cannabis herb is seized in North America, notably Mexico and the United States. With seizures of 2,164 metric tons in 2004, Mexico leads the world's ranking, accounting for 35 per cent of global seizures, followed by the United States, where 1,118 metric tons of cannabis herb were seized in 2004. While the overall proportion of seizures made in North America has largely remained stable, less seizures are made in South America: whereas in 1990, South America accounted for 46 per cent of global cannabis herb seizures, this share has fallen to 7 per cent in 2004. The share of Africa, on the other hand, has been increasing continuously: from 16 per cent of global cannabis herb seizures in 1990 to 20 per cent in 2002 and 31 per cent in 2004. The strong upward trend recorded in 2004 can be explained by exceptionally high seizures of cannabis made in South Africa and Nigeria.

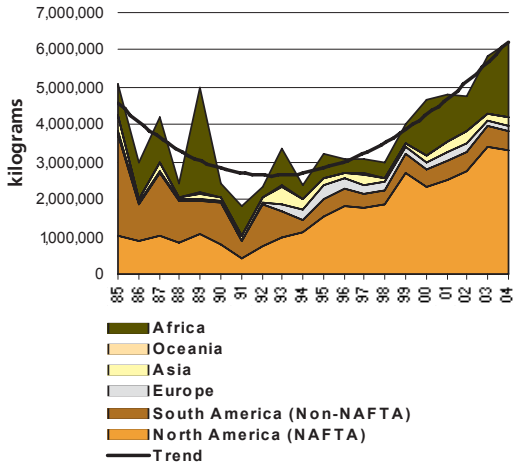
Cannabis seizures increased in Asia, primarily due to a surge of cannabis seizures in India which increased from 79 tons in 2003 to 144 tons in 2004 (+ 81 per cent). Europe presents a varied picture: While seizures in West and Central Europe declined by some 37 per cent (from 101 tons in 2003 to 63 tons in 2004), a strong upward trend was observed for East Europe where seizures of cannabis herb more than doubled: from 42 tons in 2003 to 97 tons in 2004 (+ 130 per cent). Almost all of this increase reflects an upsurge of cannabis herb seizures in the Russian Federation (from 41 tons in 2003 to 89 tons in 2004). Cannabis seizures declined in Oceania.

Fig. 81: Cannabis seizures, 1985-2004



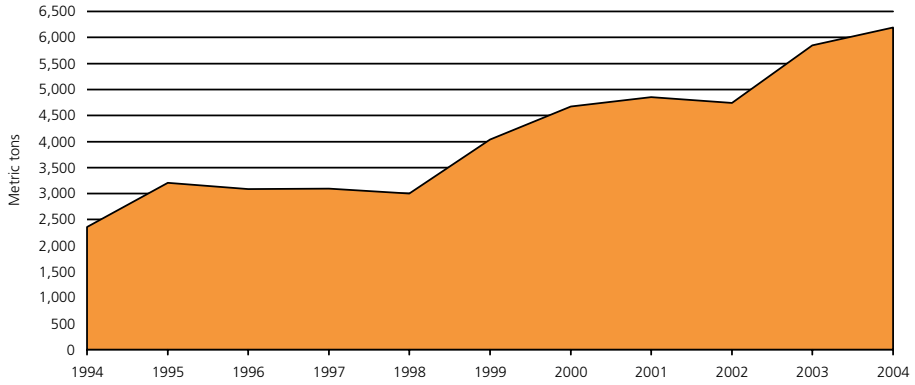
Source: UNODC, Annual Reports Questionnaire data.

Fig. 82: Regional breakdown of cannabis herb seizures, 1985-2004

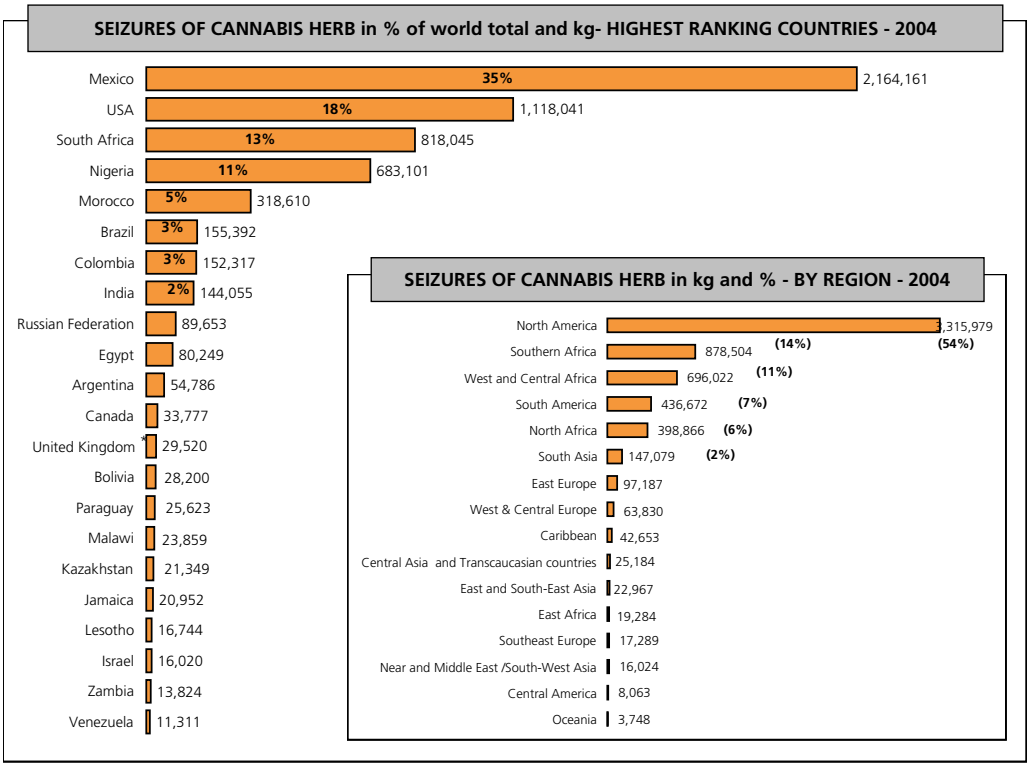


Source: UNODC, Annual Reports Questionnaire data.

Fig. 83: Global seizures of cannabis herb, 1994 -2004

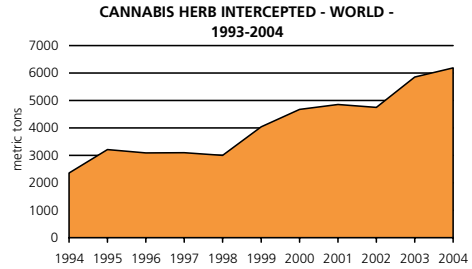


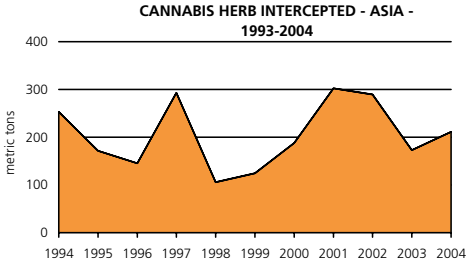
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Metric tons	2,358	3,209	3,089	3,097	2,998	4,042	4,674	4,857	4,745	5,850	6,189

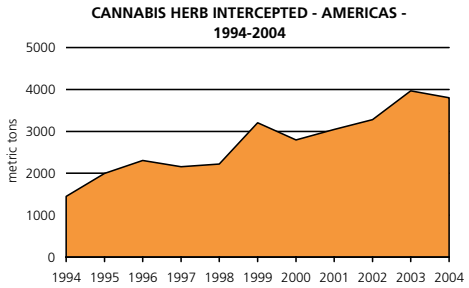


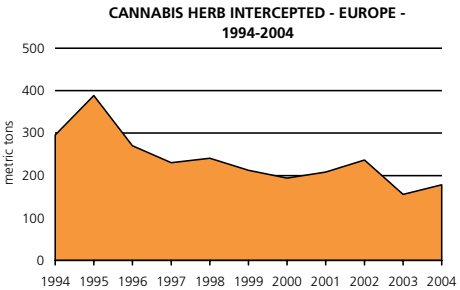
* data refer to 2003

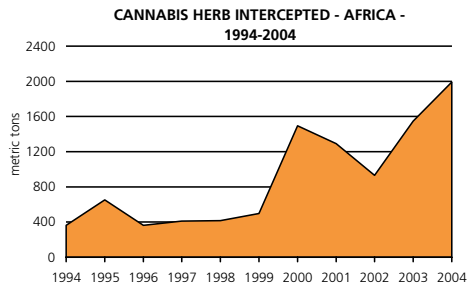
Fig. 84: Global seizures of cannabis herb, 1994 -2004

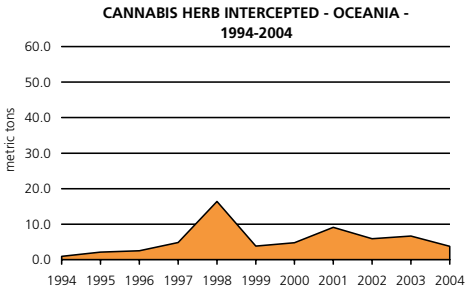




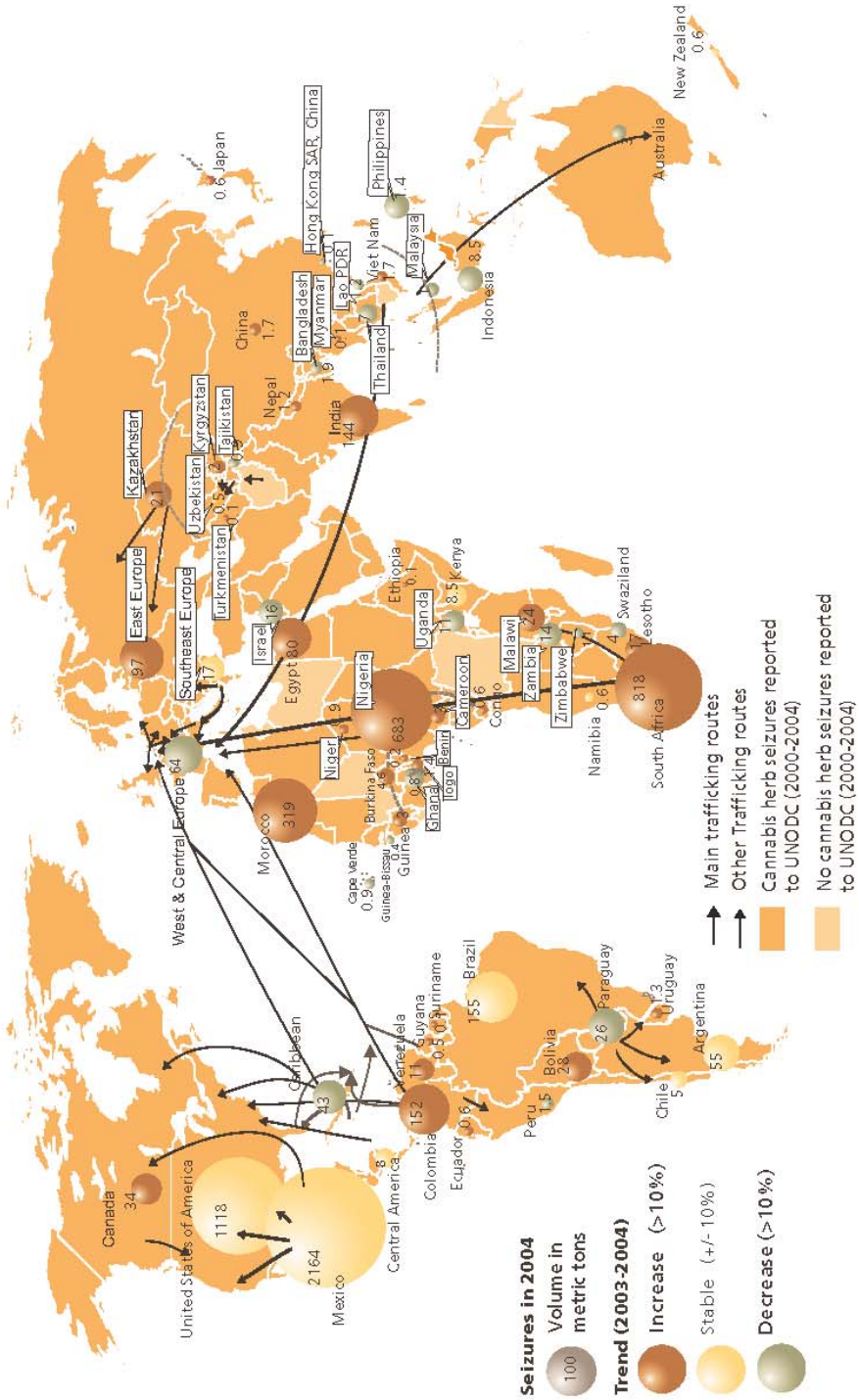








Map 15: Cannabis herb seizures 2003 - 2004: extent and trends (countries reporting seizures of more than 10 kg.)



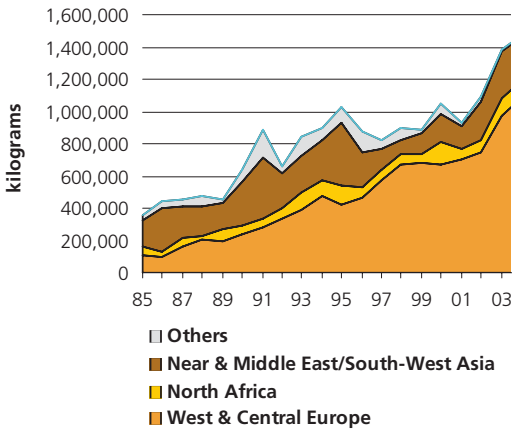
Note: Routes shown are not necessarily documented actual routes, but are rather general indications of the directions of illicit drug flows.

Trafficking in cannabis resin

Global cannabis seizures increase to all time high in 2004

Global cannabis resin seizures increased by 6 per cent to 1,471 metric tons, reaching a new all time high. The increases were most significant in West and Central Europe (+ 13 per cent), the largest market for cannabis resin in the world. Cannabis resin seizures declined in Africa, Asia, the Americas and Oceania.

Fig. 85: Global cannabis resin seizures, 1985-2004



Source: UNODC, Annual Reports Questionnaire Data / DELTA.

Most cannabis resin seizures are made in West & Central Europe, followed by Near and Middle East / South-West Asia and North Africa…

Three subregions account for 99 per cent of global cannabis resin seizures: West and Central Europe (74 per cent), Near and Middle East/South-West Asia (18 per cent) and North Africa (7 per cent). The largest seizures worldwide were reported by Spain (794 metric tons or 54 per cent of the total), followed by Pakistan (135 metric tons or 9 per cent), Morocco (86 metric tons or 6 per cent) and Iran (86 tons or 6 per cent). In Afghanistan, cannabis resin seizures declined by almost half, from 81 tons in 2003 to 41 tons in 2004. In Algeria, seizures of some 12 tons of cannabis resin were reported for 2004, more than double the quantity seized in 2002.

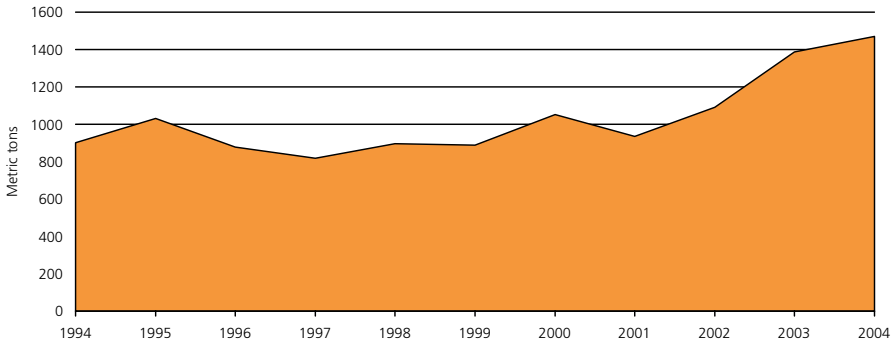
Europe continues to be the main destination of cannabis resin

The main destination of cannabis resin is West & Central Europe. About 80 per cent of the cannabis resin destined for the West & Central European market is estimated to originate in Morocco. Much of the cannabis resin transits Spain and the Netherlands before being shipped to other countries. The remainder of the resin supply originates in Afghanistan/Pakistan, Central Asia (mostly for the Russian Federation, other CIS states and some of the Baltic countries) or from within Europe (mainly Albania, supplying the markets of various Balkan countries and Greece).

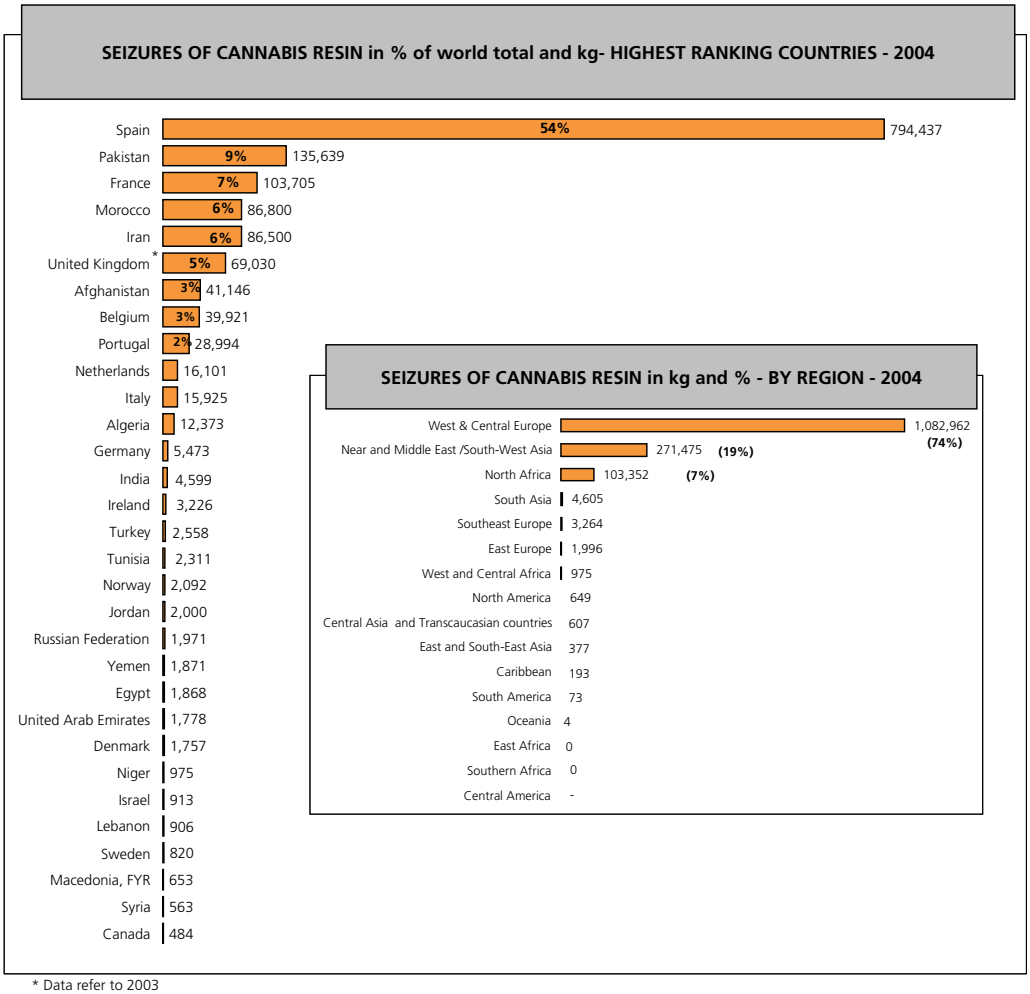
The second largest destination of cannabis resin is the Near and Middle East / South-West Asia region. This region is mainly supplied from cannabis resin produced in Afghanistan and Pakistan and, to a lesser degree, from cannabis resin originating in Lebanon. Some of the cannabis resin from Afghanistan/Pakistan is also being shipped to Canada and to countries in Eastern Africa.

North Africa makes up the third largest market and is predominantly supplied by cannabis resin produced in Morocco. The importance of other markets is limited. Nepal is a source country for cannabis resin exports to India and to some other countries and Jamaica is a source country for cannabis resin exports to some other countries in the Americas.

Fig. 86: Global seizures of cannabis resin, 1993 - 2004

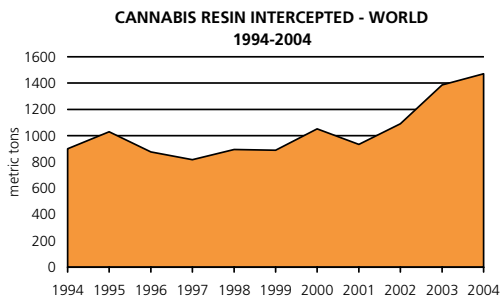


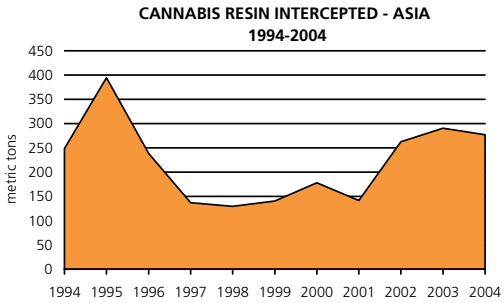
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Metric tons	901	1,030	877	818	896	889	1,053	934	1,090	1,386	1,471

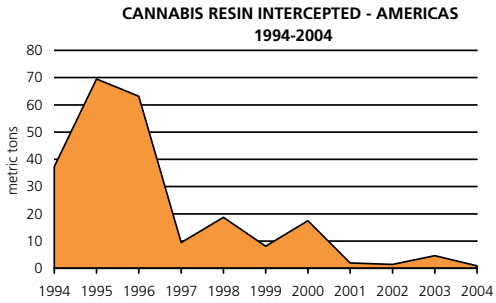


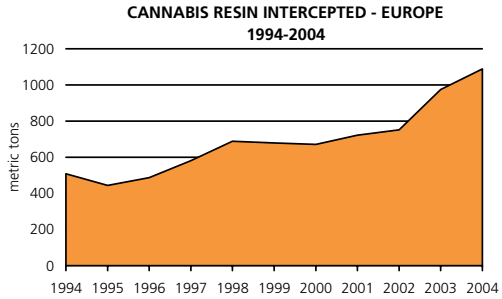
* Data refer to 2003

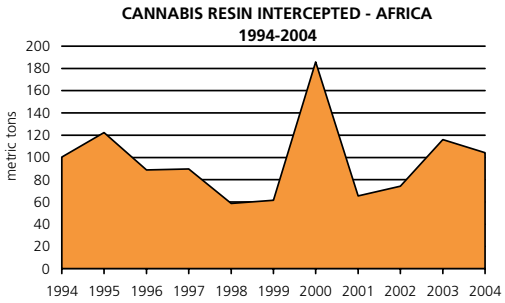
Fig. 87: Global seizures of cannabis resin, 1994-2004

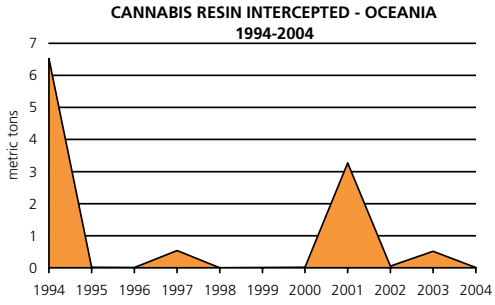




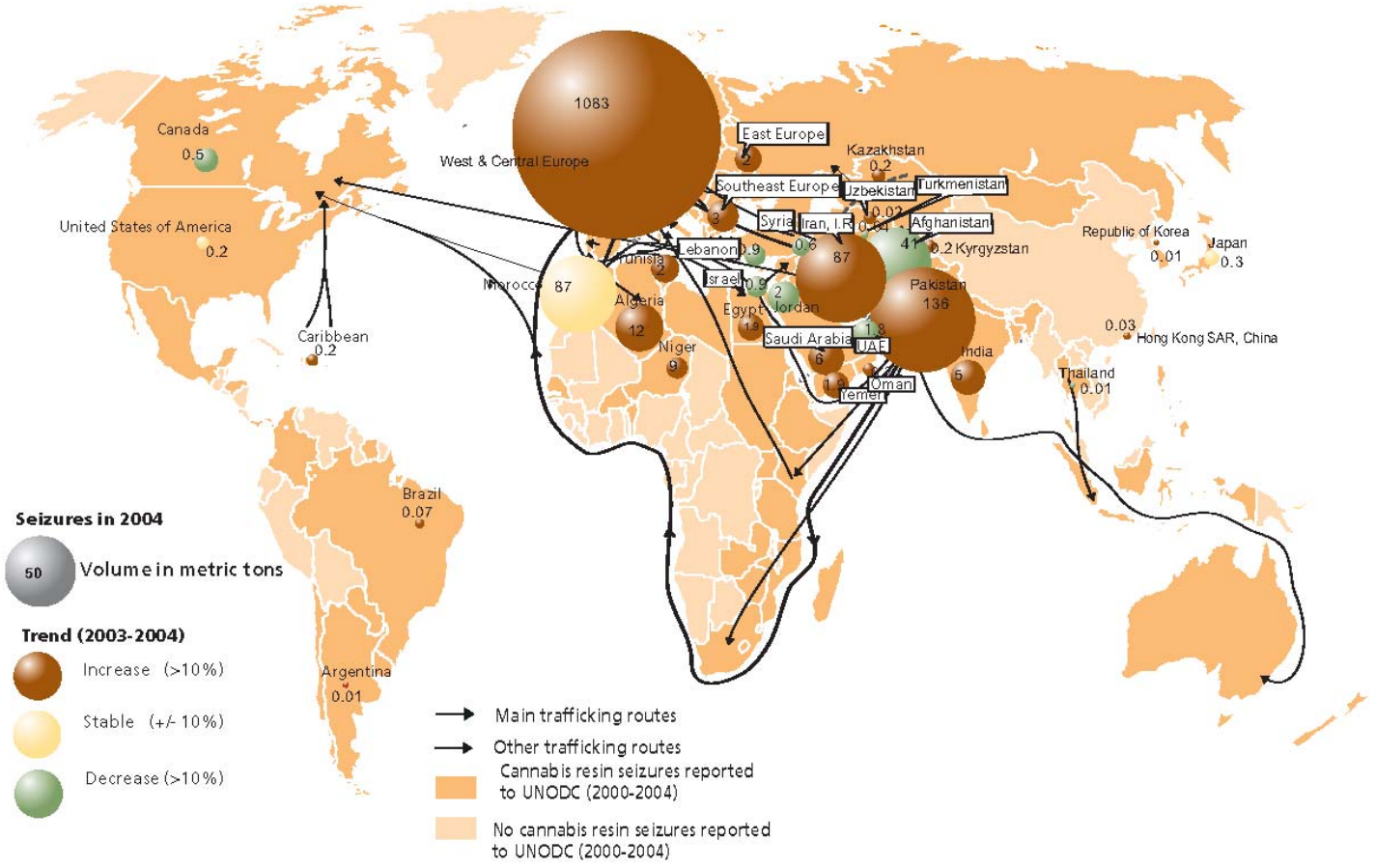








Map 16: Cannabis resin seizures 2003 - 2004: extent and trends (countries reporting seizures of more than 10 kg.)



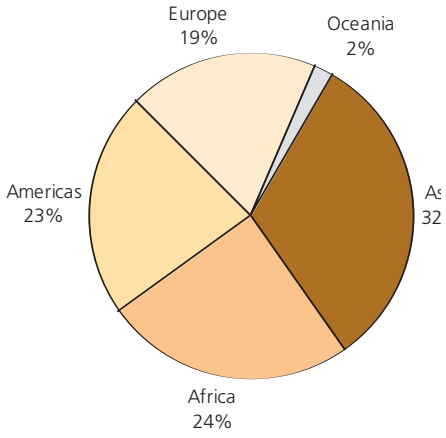
Note: Routes shown are not necessarily documented actual routes, but are rather general indications of the directions of illicit drug flows.

1.5.3 Abuse

Cannabis continues to be, by far, the most widely used drug in the world

Cannabis remains by far the most commonly used drug in the world. An estimated 162 million people used cannabis in 2004, equivalent to 3.9 per cent of the global population age 15-64. In relative terms, cannabis use is most prevalent in Oceania, followed by North America and Africa. While Asia has the lowest prevalence expressed as part of the population, in absolute terms it is the region that is home to some 52 million cannabis users, more than a third of the estimated total.

Fig. 88: Global cannabis market - breakdown by region



Sources: Sources: UNODC, Annual Reports Questionnaire Data, Govt. reports, reports of regional bodies, UNODC estimates.

Global cannabis use continues to increase - though after years of significant increases, it plateaus at current levels in some regions

After years of reported increases, cannabis use appears to have stabilized at current levels in North America, some countries of East and South-East Asia and in some countries of Western Europe. Cannabis use continues to increase in some countries in South, Central and East Europe and in Africa.

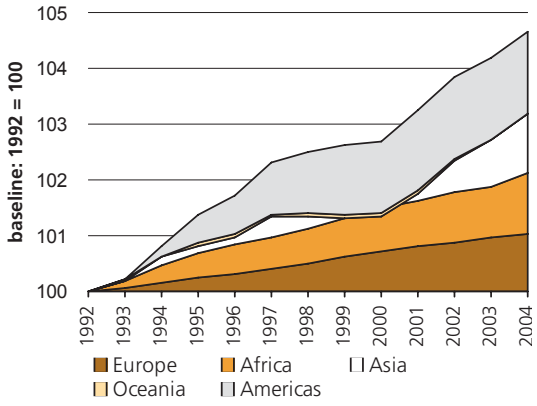
UNODC's annual prevalence estimate is only slightly higher than that published in 2005 *World Drug Report*. Stable or declining use rates of cannabis were reported in Oceania and the Americas. The annual prevalence of cannabis of secondary school students remained stable in the United States in 2005. Large increases in the use of cannabis have been primarily reported in African countries (eg. Algeria, Nigeria, Zambia).

The drug use trends, as perceived by experts, continued pointing upwards at the global level, suggesting a further expansion of the cannabis market. Since the late 1990s, cannabis use - as shown by the UNODC annual prevalence estimates – has increased by more than 10 per cent at the global level.

Over the last decade, cannabis use has increased in almost all regions, except Oceania

UNODC's drug use trends, as perceived by experts, suggest that there has been an increase in cannabis use in

Fig. 89: Twelve-year cannabis use trends, as perceived by experts



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Table 11: Annual prevalence of cannabis use, 2003-2005

	Cannabis use	
	No. of users	*in % of population age 15-64*
EUROPE	30,800,000	5.6
West & Central Europe	23,400,000	7.4
South-East Europe	1,900,000	2.3
East Europe	5,500,000	3.8
AMERICAS	36,700,000	6.4
North America	29,400,000	10.3
South America	7,300,000	2.6
ASIA	52,100,000	2.1
OCEANIA	3,200,000	15.3
AFRICA	39,600,000	8.1
GLOBAL	**162,400,000**	3.9

Above global average
Around global average
Below global average

Sources: Annual Reports Questionnaire data, various Government reports, reports of regional bodies, UNODC estimates.

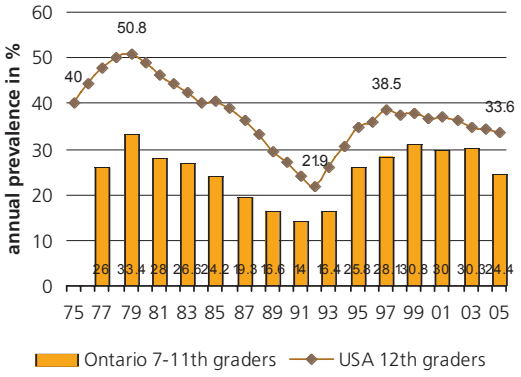
most regions, with the exception of Oceania where a downward trend has been observed. However, Oceania has traditionally had the highest cannabis prevalence rates in the world.

Cannabis use in the Americas increased strongly in the 1990s but has stabilized over last few years

UNODC's drug trends indicator has shown strong increases of cannabis use in the 1990s, clearly exceeding the global trend indicator. Since 2001, cannabis use is perceived to have been practically stable in the Americas. Nonetheless, the Americas showed the highest increase of all regions after 12 years.

But these findings have to be qualified. Available trend data for North America, as reflected in regularly undertaken school surveys, show indeed strong increases in cannabis use in the 1990s. But, this was followed by a stabilization in Canada as of 1999 (and a decline in 2005) and a gradual decline in the United States since 1997 (among 12th grade students). While for each individual year the decline was not statistically significant, over the 1997-2005 period cannabis use among 12th grade students in the United States declined by almost 13 per cent. In both Ontario, Canada, and in the United States prevalence rates in 2005 were lower than two decades ago.

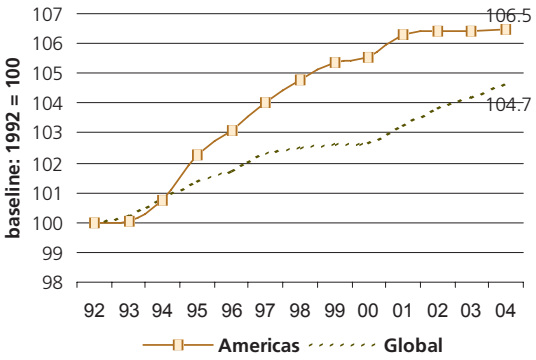
Fig. 90: Annual prevalence among high-school students in the USA and in Canada (Ontario only), 1975-2005



Sources: NIDA, *Monitoring the Future, 2005* and CAMH, Ontaria Drug Use Survey 2005.

School surveys carried out in Brazil show a similar trend. Strong increases were observed in the past. Lifetime prevalence of cannabis use in 10 state capitals of Brazil among 10-18 year old students increased from 3.4 per cent in 1989, to 4.5 per cent in 1993 and to 7.6 per cent in 1997.[26] New school studies conducted in Brazil across the country in 2004[27] revealed – using data from the same 10 capital cities - a decline to 6.4 per cent (unweighted average). The Brazilian data also suggest that cannabis use was in 2004 significantly higher than a decade ago but lower than in the late 1990s.

Fig. 91: Twelve-year cannabis use trends as perceived by experts: Americas

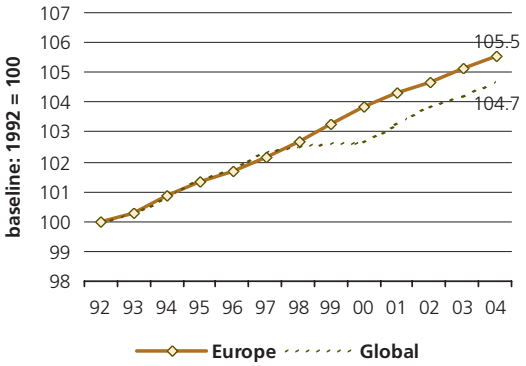


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Cannabis use continues to rise in Europe

UNODC's cannabis trend indicator for Europe shows an ongoing upward trend, even though cannabis use has apparently stabilized in a number of West European countries, including the Nordic countries, France and Germany. In much of the rest of Europe, cannabis is reported to continue growing. UNDOC's cannabis trend indicator for Europe shows thus a higher level than the global indicator, having exceeded the global average as of 1999.

Fig. 92: Twelve-year cannabis use trends as perceived by experts: Europe

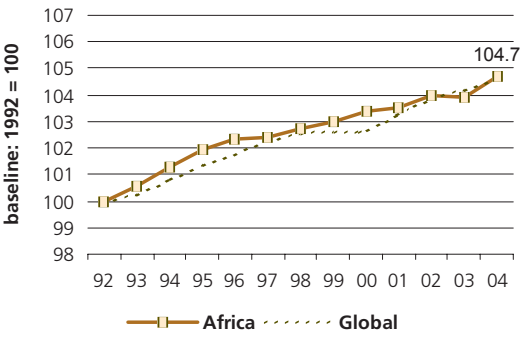


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Higher cannabis use in Africa

Cannabis use in Africa is on the rise. Cannabis use was reported to have grown in all years in Africa since 1992. It is likely that the drug use trend has been underestimated as many countries in Africa have not regularly submitted annual reports questionnaires. Strong growth

Fig. 93: Twelve-year cannabis use trends as perceived by experts: Africa



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

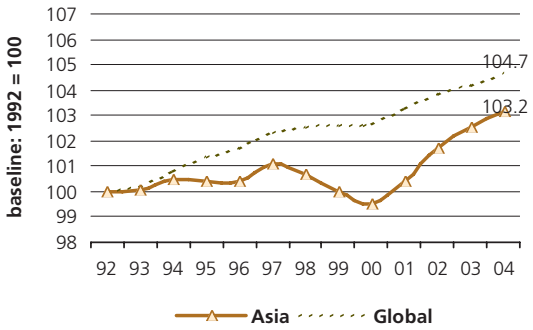
26 IV Levantamento sobre o Uso de Drogas entre Estudantes de 1 e 2 graus em 10 Capitais Brasileiras, 1997.
27 CEBRID, Levantamento Nacional Sobre o Uso de Drogas Psicotrópicas entre Estudantes do Ensino Fundamental e Médio da Rede Pública de Ensino nas 27 Capitais Brasileiras, 2004.

in recent years has been reported in much of western, eastern and northern Africa.

After some decline in the late 1990s, cannabis use surging in Asia

Over the 1992-1995 period, UNODC's drug trend indicator for Asia remained below the global average. However, it has shown some of the strongest growth rates since 2000, following some declines in the late 1990s. Exceptions to this general upward trend are a number of countries in South-East Asia which reported either stable or declining cannabis use.

Fig. 94: Twelve-year cannabis use trends as perceived by experts: Asia



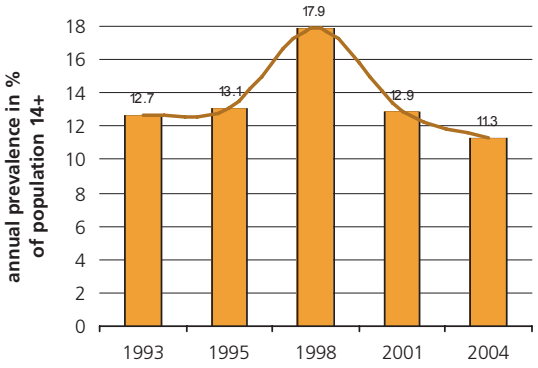
Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Continuous declines of cannabis use in Oceania

In contrast to most regions, a clear downward trend in cannabis use has been reported from Oceania. Australian Household Survey data suggest that cannabis use declined by some 37 per cent between 1998 and 2004 and that cannabis use levels are now below the levels in 1993. Similarly, the drug trend indicator – after having exceeded the global average in the second half of the 1990s - shows for Oceania slightly lower levels than in 1992, twelve years earlier.

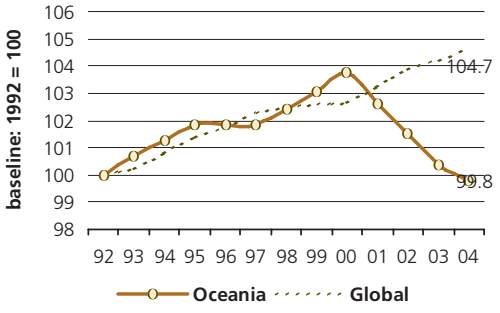
Though no definite answers as to the reasons for the massive decline exist, there are indications that the wide spread of cannabis use in Australia (and other countries in Oceania) in the late 1990s, in combination with growing levels of THC, meant that problems related to cannabis use became more apparent, notably to younger users, so that the substance has lost some of its previous benign image. There has also been far more media attention to the adverse effects of cannabis, particularly cannabis psychosis, prompting potential users to reconsider their choices.

Fig. 95: Annual prevalence of cannabis use among the general population in Australia, 1993-2004



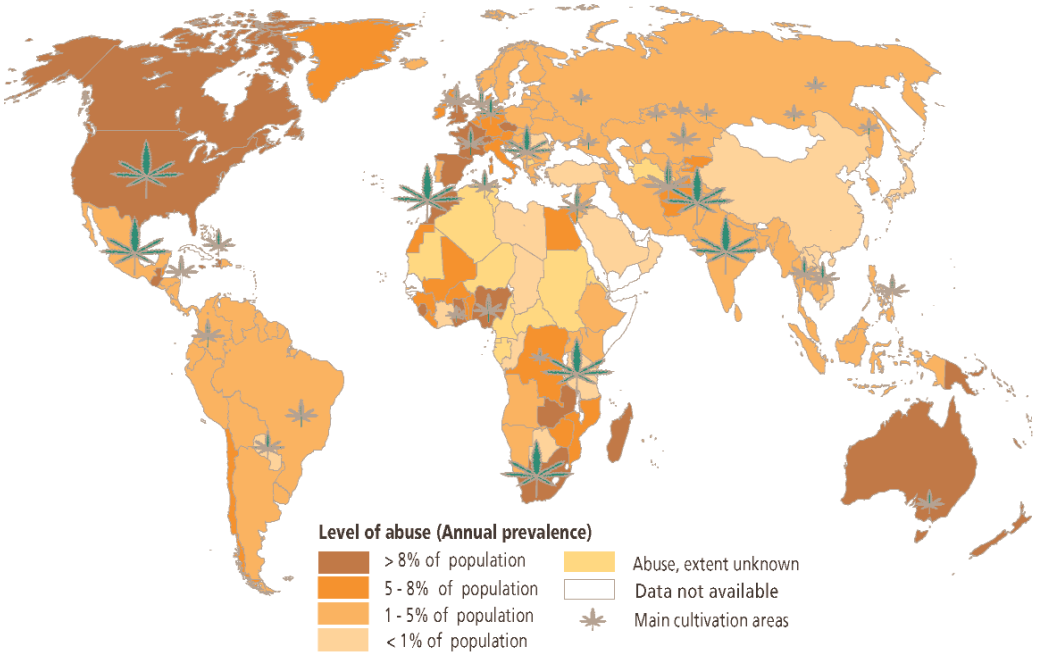
Source: Australian Institute of Health and Welfare, *The 2004 National Drug Strategy Household Survey.*

Fig. 96: Twelve-year cannabis use trends as perceived by experts: Oceania

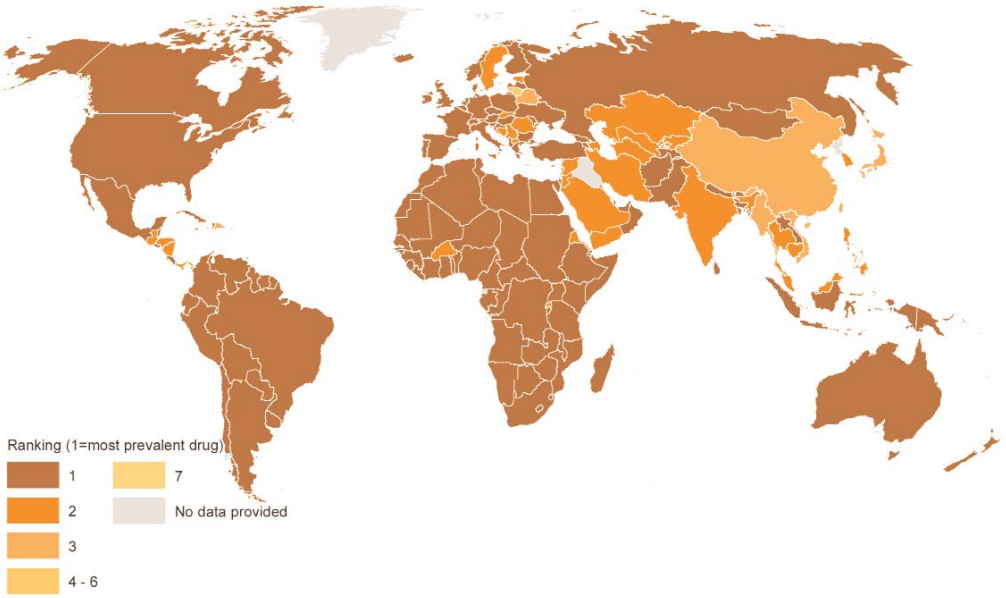


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Map 17: Use of cannabis 2003-2004 (or latest year available)

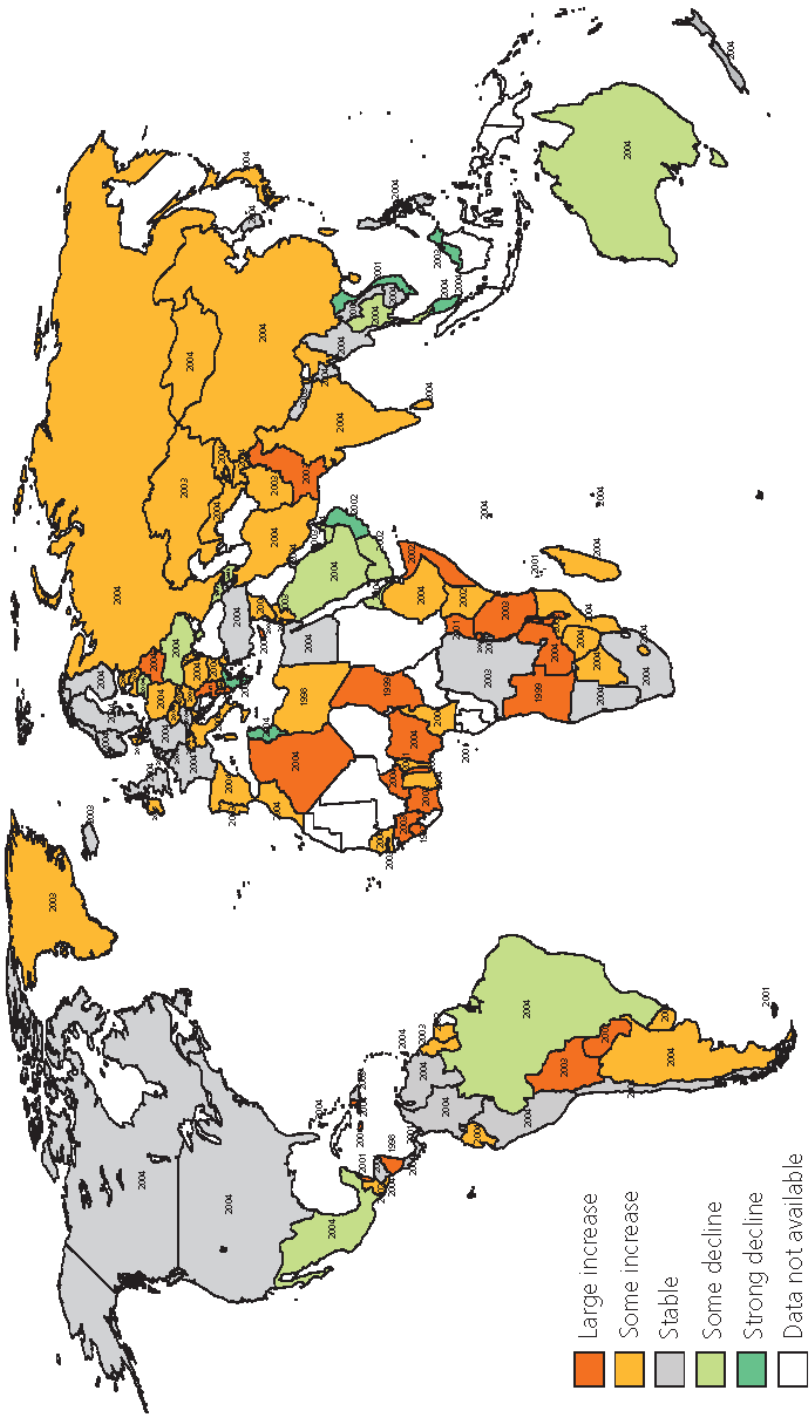


Map 18: Ranking of cannabis in order of prevalence in 2004 (or latest year available)



Sources: UNODC Annual Reports Questionnaires data, SAMSHA US National Household Survey on Drug Abuse, Iranian Ministry of Health, Rapid Assessement Study and UNODC ARQ,Council of Europe, ESPAD.

Map 19: Changes in use of cannabis, 2004 (or latest year available)



Source: UNODC Annual Reports Questionnaire Data and national reports.

1.6 Amphetamine-type stimulants

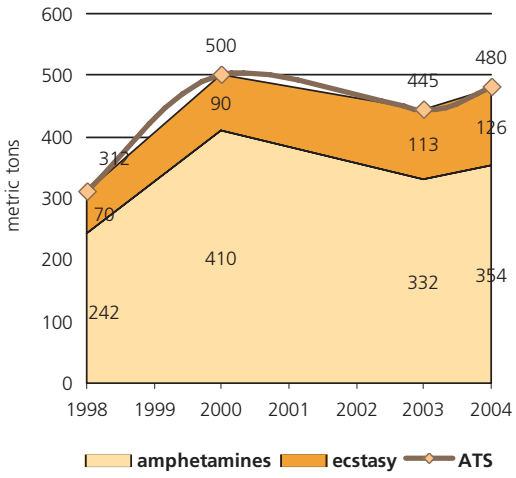
1.6.1 Production

Global ATS production estimated at some 480 metric tons

The group of amphetamine-type stimulants (ATS) encompasses amphetamines (amphetamine, methamphetamine), ecstasy (MDMA and related substances) and other synthetic stimulants (methcathinone, phentermine, fenetylline etc.).

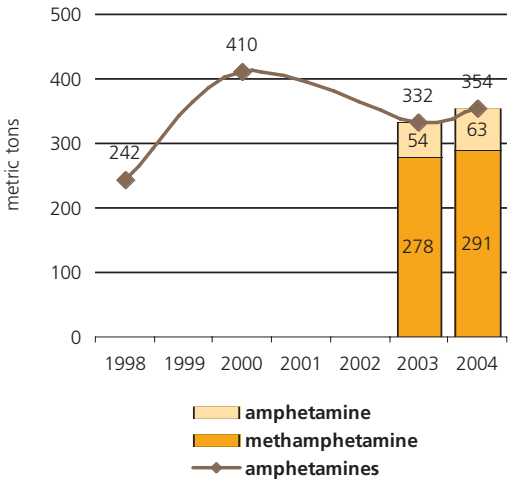
Based on ATS consumption estimates, ATS seizure data and ATS precursor seizures, UNODC estimates total ATS production to have amounted to some 480 tons in 2004 (range: 285 - 1,184 tons).[28]

Fig. 97: UNODC production estimate of amphetaminetype stimulants



Sources: UNODC estimates based on UNODC, Annual Reports Questionnaire Data / DELTA and INCB, 2005 Precursors, March 2006, UNODC, 2005 World Drug Report and UNODC, Ecstasy and Amphetamines – Global Survey 2003.

Fig. 98: Production estimate of amphetamines



Sources: UNODC estimates based on UNODC, Annual Reports Questionnaire Data / DELTA and INCB, 2005 Precursors, March 2006, UNODC, 2005 World Drug Report and UNODC, Ecstasy and Amphetamines – Global Survey 2003.

Most of the production is 'amphetamines' (290 tons of methamphetamine and 63 tons of amphetamine), followed by ecstasy (mainly MDMA, about 126 metric tons). While these estimates are slightly higher than those published in the 2005 World Drug Report (445 tons), they are somewhat lower than those for 2000. Following a continuous increase in ATS production throughout the 1990s, production peaked in 2000, before dropping off over the 2001-2003 period and regaining strength in 2004. The increase in the overall production estimate was largely due to more production of ecstasy in 2004.

Several conflicting indicators cloud the dynamics of the ATS market. This is particularly true for amphetamines. Reports of record seizures for precursors used in the pro-

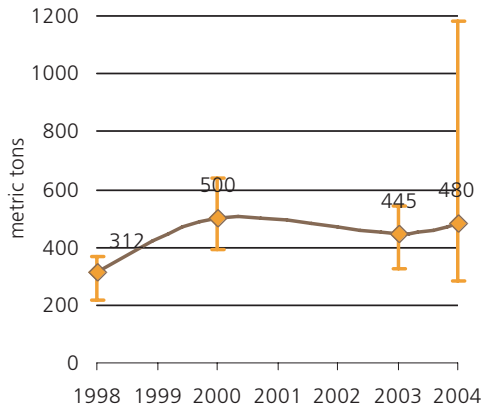
28 Production of ATS can only be estimated indirectly. The methodology for establishing ATS production estimates was first outlined in Ecstasy and Amphetamines - A Global Survey 2003 (United Nations Office on Drugs and Crime, 2004).

duction of amphetamines and dismantled clandestine laboratories appear to point to an expansion in production. However, declining seizures of amphetamines and Member States reporting lower abuse levels suggest a stable market. As a result of these inconsistencies, the margin of error for the current amphetamines production estimate is higher than it has ever been (between an estimated 227 and 978 tons). This may also explain why perceptions of trends regarding the development of the amphetamines markets diverge, for the time being, among experts and policy makers across the world.

Taking drug prices and purities as a point of departure, two possible scenarios emerge. One scenario suggests a reduction in amphetamine production due to the large scale dismantling of laboratories and the record precursor seizures. The subsequent decline in end-product seizures would have supported this scenario, as less production would also mean less trafficking and thus less seizures. However, if this had been the case, amphetamines prices should have risen substantially in 2004 and purity levels should have dropped. The available price and purity data fail to support this scenario.

The alternative scenario would have been one of large-scale increase in amphetamines production in 2004, reflecting the dramatic rise in precursor seizures and dismantling of laboratories. Under this scenario, amphetamines prices should have dropped substantially and purity levels should have increased. Again, this did not happen. A rather stable trend was observed for these indicators at the global level, showing some moderate increases in purities and some moderate declines in prices.

Fig. 99: ATS production estimates and potential margins of error



Sources: UNODC estimates based on UNODC, Annual Reports Questionnaire Data / DELTA and INCB, 2005 Precursors, March 2006, UNODC, 2005 World Drug Report and UNODC, Ecstasy and Amphetamines – Global Survey 2003.

Thus, the most likely scenario is one of a relatively stable or just slightly increasing production trend. This seems to be essentially reflected in UNODC production estimates for amphetamines for 2004, derived from consumption, end-product seizures and precursor seizures. Improved international cooperation is likely to have increased the seizure rate of precursors. Although the number of dismatled latoratories has risen, dismantling of so-called super-labs has actually declined. Therefore a large increase in laboratory seizures in 2004 did not necessarily have to indicate any significant increase in production levels.

The upward trend for ecstasy is more robust. Though production may have well declined in the largest ecstasy producing centre (Netherlands) and consumption definitely declined in the world's single largest ecstasy market (United States), there seem to be, nonetheless, less discrepancies with regard to the overall upward trend in global ecstasy production. UNODC estimates suggest that ecstasy production increased from between 34 and 141 tons in 2003 to between 81 and 206 tons in 2004. Though – theoretically – production margins are still large enough to allow for a decline in production, this would seem to be extremely unlikely as all underlying indicators moved clearly upwards in 2004: UNODC prevalence estimates rose by 22 per cent, ecstasy seizures rose by 87 per cent and seizures of ecstasy precursor chemicals rose by 113 per cent, largely due to important seizures of 3,4-MDP-2-P (also known as PMK), the main precursor for ecstasy.

ATS production occurs mostly in North America, East and South-East Asia and in Europe

The increasing number of countries where clandestine ATS laboratories are dismantled indicates that ATS production is spreading in geographical terms. Nonetheless, clear concentrations of ATS production can be still identified. While proportions differ depending on the specific indicator used and the specific substances analysed, all available indicators suggest that ATS production continues being concentrated in North America, East and South-East Asia and in Europe. Most of the amphetamine production takes place in Europe; most of the methamphetamine production occurs in North America and East and South-East Asia and most ecstasy is produced in Europe and in North America.

While seizures decline, the number of dismantled ATS laboratories rises

The number of globally dismantled ATS laboratories, as reported to UNODC, increased from 547 in 1990 to

Table 12: Production estimates of amphetamine-type stimulants, 2004

Based on	'Amphetamines' (methamphetamine, amphetamine)		Ecstasy		Total	
	Estimate	Range	Estimate	Range	Estimate	Range
Consumption	272	227-318	136	121-151	408	348-469
Drug seizures	247	204-291	98	81-115	346	285-406
Precursor seizures	541	456-978	144	96-206	685	552-1184
Average of all estimates	**354**	**227-978**	**126**	**81-206**	**480**	**285-1184**

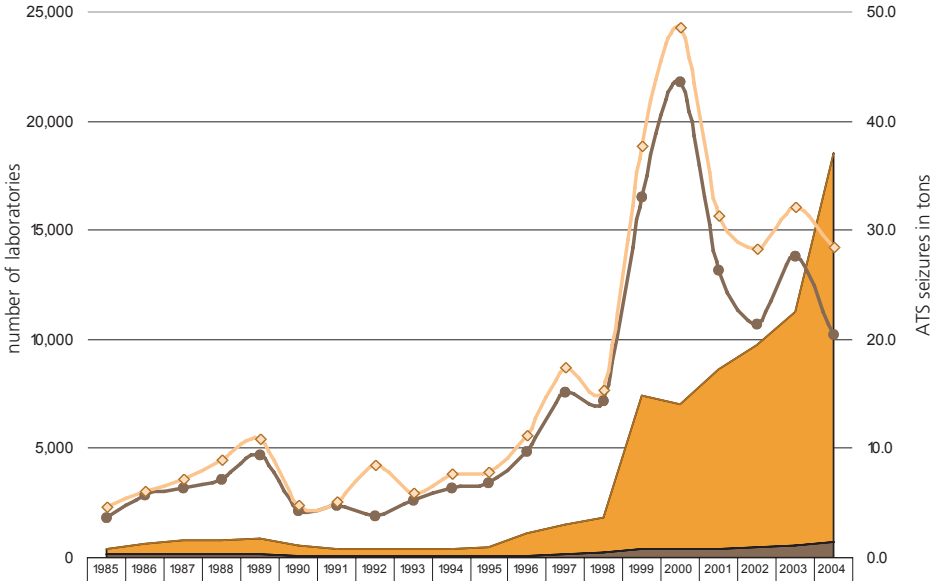
Sources: UNODC estimates based on UNODC, Annual Reports Questionnaire Data / DELTA and INCB, 2005 Precursors, March 2006.

7,028 in 2000 and to a record high of 18,532 in 2004. Out of all globally dismantled laboratories, 64 per cent produced ATS in 2004, up from 60 per cent a year earlier, 50 per cent in 2000 and 19 per cent in 1990.

Much of the increase in the 1990s was a reflection of the growth in ATS production. Whether this is, however, still the case, is less clear as the large-scale dismantling of laboratories may have helped to reduce, at least, the expansion of ATS production at the global level. After having risen strongly in the 1990s, global ATS seizures declined by 11 per cent in 2004 and by 41 per cent since 2000. Seizures of amphetamines (methamphetamine and amphetamine) fell by 26 per cent in 2004 and by 53 per cent over the 2000-2004 period.

The overwhelming majority of dismantled ATS laboratories were producing methamphetamine (17,851 or 96 per cent of the total in 2004) and the enormous increase in 2004 is largely linked to the dismantling of methamphetamine laboratories.

Fig. 100: Number of dismantled ATS laboratories and ATS seizures, reported to UNODC, 1985-2004

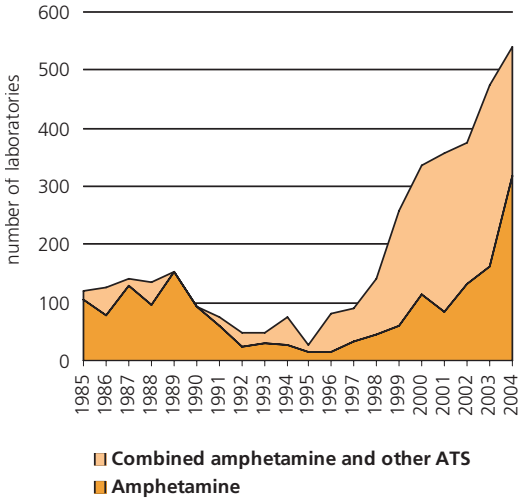


	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Methamphetamine labs	0.3	0.5	0.7	0.6	0.7	0.4	0.3	0.3	0.3	0.3	0.4	1.0	1.4	1.7	7.0	6.6	8.2	9.3	10.7	17.9
Other ATS labs	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.4	0.4	0.5	0.6	0.7
Total	0.4	0.7	0.8	0.8	0.9	0.5	0.4	0.4	0.4	0.4	0.5	1.1	1.5	1.9	7.4	7.0	8.6	9.8	11.3	18.5
ATS seizures	4.7	6.1	7.1	8.9	10.8	4.8	5.1	8.5	6.0	7.7	7.8	11.2	17.4	15.4	37.7	48.6	31.3	28.2	32.0	28.5
ATS seizures excluding ecstasy	3.7	5.8	6.4	7.3	9.4	4.2	4.8	3.9	5.3	6.4	6.8	9.7	15.2	14.4	33.1	43.6	26.3	21.5	27.7	20.4

Source: UNODC, Annual Reports Questionnaire Data/DELTA.

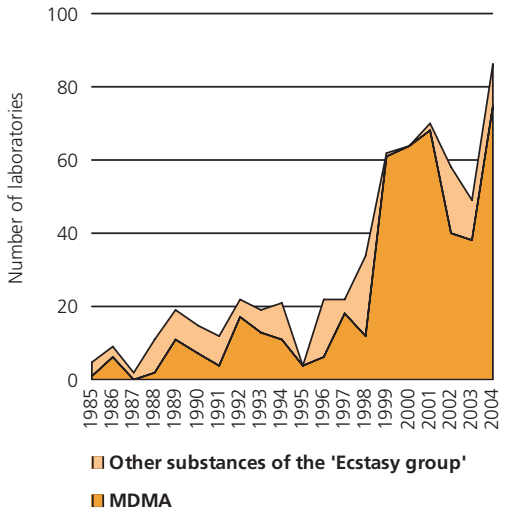
However, the number of laboratories where other ATS were manufactured also increased over the past five years, from 109 in 1990 to 419 in 2000 and 681 in 2004. The number of amphetamine laboratories seized more than doubled over the same period, from 115 in 2000 to 319 in 2004. In addition, 86 'ecstasy' laboratories were seized; up from 64 in 2000 and 15 in 1999.

Fig. 101: Number of dismantled amphetamine laboratories, reported to UNODC, 1985-2004



Source: UNODC, Annual Reports Questionnaire Data/DELTA.

Fig. 102: Number of dismantled 'ecstasy' laboratories, reported to UNODC, 1985-2004



Source: UNODC, Annual Reports Questionnaire Data/DELTA.

Most methamphetamine laboratories are dismantled in North America

The overwhelming majority of methamphetamine laboratories (97 per cent) were dismantled in North America, mainly the United States, and, to a lesser extent, Mexico. Methamphetamine laboratories were also dismantled in Oceania, in East and South-East Asia, in Europe (mainly Czech Republic, followed by Slovak Republic and Republic of Moldova) and in South Africa (which appears to be emerging as an important local production centre).

Despite its substantial proportion of global methamphetamine production, the number of methamphetamine laboratories dismantled in East & South-East Asia continues to be low. Just 13 methamphetamine laboratories were dismantled and reported to UNODC from this region in 2004, down from 75 in 2001. Most methamphetamine laboratories seized in Asia over the 2002-2004 period were reported from China, Philippines, Taiwan Province of China, Myanmar, Cambodia (tabletting facilities only), Hong Kong SAR of China and Malaysia.

For comparison, according to the International Narcotics Control Board, authorities in South Africa alone, dismantled 28 illicit ATS laboratories, producing either methamphetamine or methcathinone in 2004.

Increasing seizures of ecstasy laboratories in North America indicate shift in production

Most amphetamine laboratories were seized in Europe (61 per cent), mainly Russian Federation, Poland, Netherlands, Bulgaria, Germany, Belgium, Spain, Estonia and Lithuania while 39 per cent were dismantled in North America, primarily the United States. As for ecstasy, 48 per cent of all ecstasy laboratories were seized in North America (United States and Canada), 23 per cent in Europe (mainly Netherlands, followed by Belgium and Estonia).

The most striking trend has been the decline of Europe in the proportion of dismantled ecstasy laboratories - from 75 per cent in 2000 to 39 per cent in 2003 and 23 per cent in 2004. The importance of Europe as the world's main ecstasy production centre thus appears to be declining which can be also seen in ecstasy seizure statistics: 81 per cent in 1994; 56 per cent in 2000, 53 per cent in 2004. Some of the production has shifted to North America (mainly United States and Canada).

Increasing ecstasy precursor seizures in North America also point in this direction. In addition, there is a proliferation of ecstasy production in other parts of the world. Over the 2002-2004 period, ecstasy laboratories were dismantled in South-East Asia (Indonesia, China, Hong Kong SAR of China, Malaysia), in Oceania (Australia and New Zealand), in Africa (South Africa and Egypt) and in some south American countries (Argentina (2003) and Colombia (2001)).

ATS precursor seizures reach record levels, exceeding end-product seizures

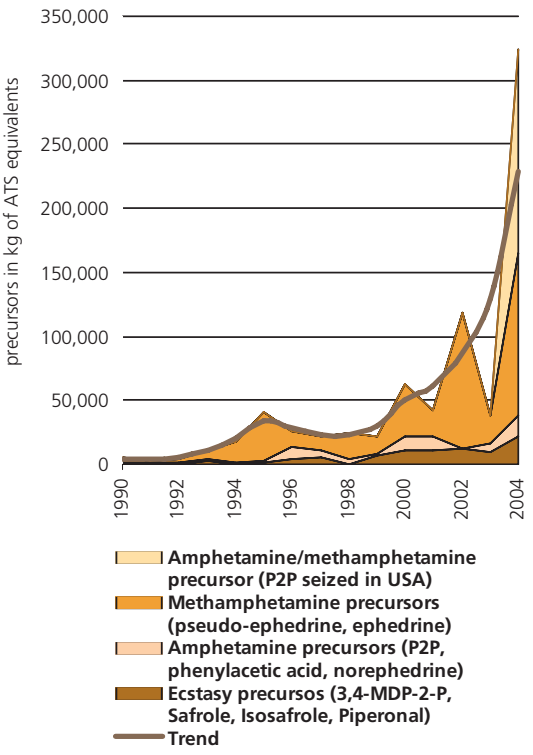
ATS precursor seizures reached an all-time high in 2004, which also reflects major successes in international cooperation, notably under Project Prism. Targeting ATS precursors, Project Prism is an initiative of the International Narcotics Control Board, carried out by 126 national authorities supported by INCB, Interpol, the World Customs Organization, UNODC and the European Community.

The results of increased international cooperation were reflected in strong increases in precursor seizures, as reported by INCB:

- The main methamphetamine precursors seized in 2004 were pseudoephedrine (176 tons) and ephedrine (15 tons). These are important quantities, given total licit trade in ephedrine of 526 tons and of 1207 tons in pseudoephedrine in 2004. The quantities seized increased from 14 tons of ephedrine and 18 tons of pseudo-ephedrine a year earlier;
- The most important amphetamine precursors were P-2-P (also known as BMK: 349 tons seized in 2004 of which at least 33 tons for amphetamine production) and, to a lesser extent, phenylacetic acid (232 kg); seizures a year earlier amounted to 5.5 tons of P-2-P and 158 kg of phenylacetic acid;
- The main ecstasy precursors are 3,4-MDP-2P (also known as PMK: 17 tons seized in 2004), piperonal (17 tons), safrole (5700 litres) and isosafrole (no seizures in 2004, 23,400 litres reported for 2003). Overall seizures of ecstasy precursors in 2003 had been substantially lower: no seizures for 3,4-MDP-2P or for piperonal and less seizures for safrole (515 litres).

If these seized precursors had been used for production purposes, they would have been sufficient to produce[29] more than 320 tons of amphetamine-type stimulants in 2004, including some 21 tons of ecstasy (10 tons in 2003), some 16 tons of amphetamine (7 tons in 2003), some 128 tons of methamphetamine (22 tons in 2003). Most of the remaining precursors could have produced either amphetamine or methamphetamine (totalling some 155 metric tons).

Fig. 103: Seizures of ATS precursors in ATS equivalents



Sources: UNODC, Ecstasy and Amphetamines, Global Survey 2003 and INCB, Precursor and chemicals frequently used in the illicit manufacture of narcotic drugs and psychotropic substances, New York 2006.

29 The following conversion ratios were used:

Methamphetamine: 150 kg of ephedrine or pseudo-ephedrine for 100 kg of methamphetamine

Amphetamine: 200 litres of P2P or 150 kg of norephedrine for 100 kg of amphetamine; or

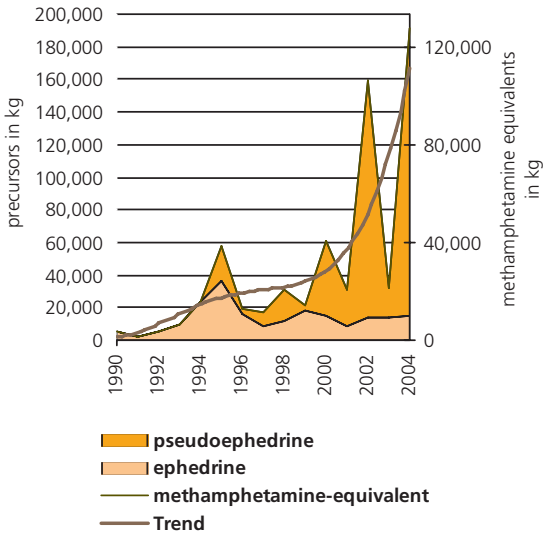
400 kilograms of phenylacetic acid for 100 kg of amphetamine

Ecstasy: 125 litres of 3,4-MDP-2-P for 100 kilograms of MDMA

262.5 kg of piperonal for 100 kg of MDMA, or 237.5 kg of isosafrole for 100 kg of MDMA; or 475 kg of safrole for 100 kg of MDMA

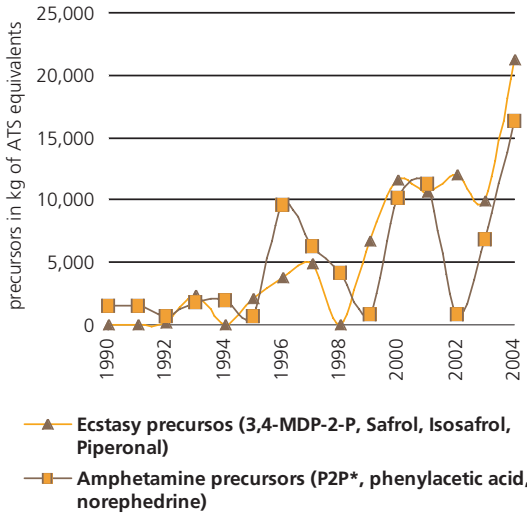
Source: *Precursors and Chemicals Frequently Used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances: Report of the International Narcotics Control Board for 2005 on the Implementation of Article 12 of the United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances*, 1988, (United Nations publication, Sales No. E.06.XI.5), New York 2006.

Fig. 104: Seizures of methamphetamine-precursors



Sources: UNODC, Ecstasy and Amphetamines, Global Survey 2003 and INCB, Precursor and chemicals frequently used in the illicit manufacture of narcotic drugs and psychotropic substances, New York 2006.

Fig. 105: Seizures of amphetamine and ecstasy precursors



* excluding P2P seizures in the United States over the 2000-2004 period

Most precursors are seized in North America, Asia and Europe

An analysis of precursor seizures for 2004, collected by the International Narcotics Control Board shows that:

- most of the methamphetamine precursors were seized in North America (92 per cent), followed by East & South-East Asia (6 per cent);
- most amphetamine precursors (Phenyl-acetic acid and P-2-P, excluding the extreme large P-2-P seizures reported by the USA (accounting for more than 90 per cent of global P-2-P seizures in 2004), were seized in Asia (72 per cent) followed by Europe (28 per cent);
- most ecstasy precursors were seized in East and South-East Asia (49 per cent), followed by Europe (43 per cent) and North America (6 per cent) and Oceania (2 per cent)

These data tend to reflect the origin of many of the chemical precursors in East- and South-East Asia while large-scale ATS production takes place in North America, East & South-East Asia and Europe. In addition, countries in South-Asia are sometimes mentioned as source countries for ATS precursors.

Asia: China, Myanmar and Philippines continue to be main methamphetamine production sites

Based on information supplied by Member States on the origin of ATS, 26 source countries for the production of methamphetamine could be identified for the 2002/04 period.

The main countries of origin for methamphetamine production in Asia continue to be China, Myanmar and Philippines.

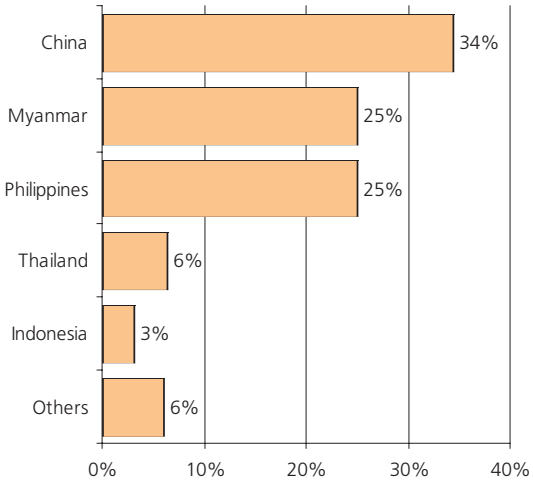
- Most of the methamphetamine production in China is located in south-eastern China, in Guangdong Province (which surrounds Hong Kong SAR of China) and, to a lesser extent in neighbouring Fujian province, located off the coast of Taiwan Province of China. China, together with India, is also one of the main source countries of ephedrine and pseudoephedrine, the main precursor chemicals used to manufacture methamphetamine.
- Significant quantities of methamphetamine are manufactured in Taiwan Province of China. In 2003, 10 laboratories were dismantled there; local production, however, appears to have declined in

recent years.

- Methamphetamine production in the Philippines appears to have increased in recent years. Four methamphetamine laboratories were dismantled in 2002, 11 in both 2003 and 2004 and 7 in 2005. Production in the Philippines may be operated by local laboratory owners but seems to be closely linked to criminal groups from China and Taiwan Province of China.
- Myanmar also continues to play an important role as a production site for methamphetamine, as reflected in neighbouring countries reports. Illicit markets in Thailand are basically supplied by methamphetamine produced in Myanmar and important parts of the Chinese market (20 per cent) are also supplied by methamphetamine produced in Myanmar. The number of dismantled laboratories, however, has not been particularly impressive in recent years (4 laboratories dismantled in 2002, 1 in 2003, 1 in 2004 and 3 in 2005). On the other hand, Myanmar authorities have stepped up efforts against trafficking in ATS, leading to a number of immense seizures of methamphetamine tablets (12 million tablets in January 2006, four times the total seized in 2005 (3.6 million)). ATS production in Myanmar is mainly encountered in the Shan state (notably in the Wa region), bordering China, though recent reports suggest that production is also taking place in areas controlled by the ethnic Chinese Kokang, the Shan State Army-South and the Kachin Defense Army (KDA). Production is sometimes co-located with heroin refineries.
- According to information provided by the Government of Thailand, methamphetamine production has largely ceased to exist following the crackdown on the market in 2003.

Most South-East Asian methamphetamine is trafficked towards Oceania, notably Australia and New Zealand, and North America. The Philippines and China have been identified as main source countries for South-East Asian methamphetamine found on North American markets. South-East Asian methamphetamine, mostly from Myanmar and the Philippines, transits Thailand before it is trafficked to European destinations, mainly the United Kingdom, Netherlands, France and Switzerland.

Fig. 106: Origin* of methamphetamine as reported by Asian countries, 2002-04



* Number of times a country was identified by other Asian countries as a source country for methamphetamine production over the 2002-04 period, expressed as a proportion of such reports (N = 32) 'Origin' refers to the countries to which drug shipments could be traced back.

Source: UNODC, Annual Reports Questionnaire Data / DELTA.

The United States and Mexico are the main production sites in the Americas

The main countries of methamphetamine production in the Americas are the United States, producing exclusively for the domestic market, followed by Mexico and, to a lesser extent, Canada. United States authorities continue to dismantle the largest numbers of methamphetamine laboratories worldwide (17,199 laboratories in 2004). Methamphetamine production in the United States has been traditionally concentrated in California and several neighbouring states, but it has been spreading towards the rest of the country and has already reached most states. A large number of laboratories (several hundred per state) are now being seized in rural America, in several states between Texas and Illinois and along the Mississippi river. Most of the 'super-labs', that is, laboratories capable of manufacturing more than 5 kg of methamphetamine in 24 hours, continue to be located in California. The number of 'super-labs' seized in the United States, has, however, shown a downward trend in recent years, from 245 in 2001 to 55 in 2004 (-77 percent) and a further decline by 34 per cent over the first half of 2005 as compared to the same period a year earlier. Mexico reported the dismantling of 18 laboratories to UNODC in 2004. Most methamphetamine production takes place in northern Mexico.

Methamphetamine production in Oceania appears to have levelled off, and shows signs of slight decrease

Methamphetamine production in Oceania is concentrated in Australia and, at lower levels, in New Zealand. Reported seizures of methamphetamine laboratories in New Zealand increased from 1 in 1998 and 9 in 2000 to 201 in 2003, before falling back to 182 in 2004. Similarly, the number of ATS laboratories dismantled in Australia rose from 10 in 1990 to 150 in 2000 and 314 in 2003 before declining to 245 (including 24 ecstasy laboratories) in 2004. Rising laboratory seizures in the 1990s did not have much of an impact on prices or purities, suggesting that production was rising. The situation was less clear for subsequent years and in 2004, falling numbers of dismantled laboratories went hand in hand with slightly falling purity levels, indicating that production was losing momentum. In line with increases in laboratory seizures in the 1990s, there were also strong increases in the number of methamphetamine consumers, suggesting increases in production. However, over the 1998-2004 period, household survey results showed some decline and consumption levels appear to have declined further in 2005 as shown in the Drug Use Monitoring in Australia (DUMA) data. Methamphetamine production in Australia takes place in practically all states though it is particularly concentrated in Queensland (35 per cent of all dismantled amphetamines laboratories in 2004, followed by New South Wales (20 per cent) and South Australia (20 per cent)). In addition to locally produced methamphetamine, there are increasing imports of methamphetamine produced in South-East Asia, notably in China and the Philippines, offsetting some the decline in domestic production.

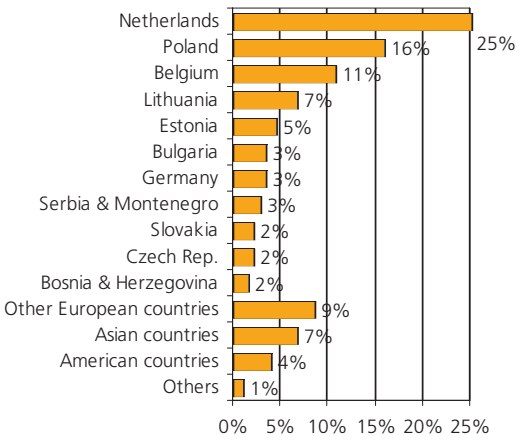
Methamphetamine production in Europe seems to be rising, though continues to be limited…

Large-scale methamphetamine production and consumption in Europe has – thus far - not occurred. European methamphetamine production continues to be largely limited to the Czech Republic and, to a lesser extent, neighbouring Slovak Republic, some of the Baltic states and Moldova. The number of dismantled methamphetamine laboratories in the Czech Republic has increased strongly over the last decade, from 18 in 1995 to 28 in 2000, 188 in 2003 and 248 in 2004. Large numbers of dismantled laboratories were also reported from Moldova (136 in 2004), followed by Slovakia (12 in 2004, up from 3 a year earlier). In addition, limited imports of methamphetamine from South-East Asia (Thailand and Philippines) have been reported in recent years.

… while amphetamine production continues to be largely concentrated in Europe – and increasing

Based on information on the origin of seized drugs, 88 per cent of the replies concerned European countries over the 2002-2004 period, suggesting that amphetamine production continues being concentrated in Europe. The Netherlands, Poland and Belgium, followed by Lithuania and Estonia, Bulgaria and Germany are frequently cited as main sources of amphetamine. In terms of amphetamine laboratories seized, Europe accounted for 77 per cent of all such laboratories over the 2002-2004 period. The number of amphetamine laboratories seized in West and Central Europe increased from 25, on average, over the 1995-99 period to 35 over the 2000-2004 period (47 in 2004). The increase has been even stronger in Eastern Europe (Belarus, Moldova, Russia and Ukraine) where reported laboratory detections increased from 11, on average, over the 1995-99 period to 94 over the 2000-2004 period (141 in 2004). Theses data suggest that there is a gradual shift of amphetamine production towards Eastern Europe, even though amphetamine production in West & Central Europe continues expanding. It is, however, not always clear whether amphetamine or methamphetamine is produced in Eastern Europe. Both the Russian Federation and Ukraine have regularly reported seizures of ephedrine but not of P-2-P. This would indicate that amphetamines production in these countries is largely focussed on methamphetamine. The largest numbers of amphetamine laboratories seized outside Europe are found in North America. In addi-

Fig. 107: Origin* of amphetamine in 2002-2004



* Number of times a country was identified by other countries as a source country for amphetamine over the 2002-04 period (n = 175), based on information provided by 40 countries

Source: UNODC, Annual Reports Questionnaire Data.

tion, significant numbers of amphetamine laboratories are seized in Oceania and a few in East & South-East Asia.

Markets in Africa and South-America mainly supplied by diverted licit ATS

Overall production of ATS continues to be limited in South America and in Africa. The main exception here is South Africa where ATS production, notably production of methamphetamine and methcathinone, has increased substantially in recent years. South Africa used to report, on average, the dismantling of one laboratory per year over the 1995-1999 period. This figure increased to 17 over the 2000-2004 period. Including methcathinone, 28 illicit laboratories were reported (to INCB) as having been dismantled in 2004 and this number is expected to have further increased in 2005.

Though domestic production of ATS is very limited in both Africa (with the exception of South Africa) and South America, drug use surveys conducted in countries of South America and Africa suggest, that ATS use is far from negligible. All of this points to ongoing supply of these markets with diverted licit ATS.

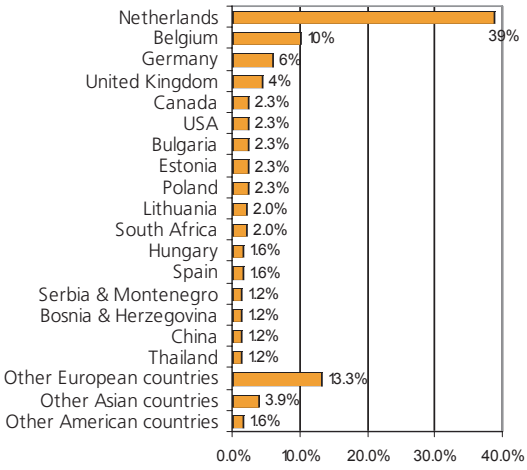
While Netherlands and Belgium remain the most important sources, ecstasy is also produced in regions other than Europe

Over the 2002-2004 period a total of 33 ecstasy producing countries were identified by UNODC member states. As in previous years the Netherlands (39 per cent), followed, by Belgium (10 per cent) have been cited by Member States as the main countries of origin for ecstasy imports over the 2002-2004 period. Together, the Netherlands and Belgium accounted for about half of all mentions. But their importance as the main source countries for ecstasy is declining. In 1999 the corresponding proportion of the two countries – using the same methodology - was still 60 per cent. There are additional indications that the position of the Netherlands and Belgium as the world's main source countries for ecstasy are waning, reflecting intensified efforts by the authorities in these countries to address the problem. While in 2001 99 per cent of all 3,4-MDP-2-P (PMK, the main ecstasy precursor) seizures took place in the Netherlands and Belgium, the proportion declined to 60 per cent in 2004 (37 per cent in the Netherlands and 23 per cent in Belgium in 2004). The number of ecstasy laboratories dismantled in the Netherlands and Belgium declined from 29 (41 per cent of the world total) in 2001 to 17 (20 per cent of the world total) in 2004, including 14 laboratories in the Netherlands and 3 in Belgium. In addition, the US authorities (the USA constitutes one of the biggest ecstasy markets worldwide) reported that the proportion of ecstasy found in the USA, originating in the Netherlands, has declined substantially in recent years.

The decline of ecstasy production in Western Europe, however, appears to have been offset by increasing levels of ecstasy produced in other countries, including other European countries, countries in North America (United States and Canada), in the Oceania region and in East and South-East Asia. The number of dismantled ecstasy laboratories in North America rose from 11 per year over the 1995-1999 period to 24 per year over the 2000-2004 period (41 in 2004); in South-East Asia as well as in the Oceania region the corresponding numbers rose from practically zero to 9 per year over the 2000-2004 period (24 in the Oceania region in 2004), also indicating that a shift towards ecstasy production outside the 'traditional' production centres in Europe is gaining momentum.

Most of the precursors for the manufacture of MDMA, notably 3,4-MDP-2-P (PMK) originate in Asia. The Chinese authorities were, however, successful in seizing substantial amounts of PMK (5,300 litres or 31 per cent of global PMK seizures). In addition, piperonal (a precursor for PMK) has gained in importance. 78 per cent: of global piperonal seizures took place in China in 2004. Moreover, safrole, another precursor for PMK, is increasingly used as a pre-precursor for MDMA; according to INCB, 97 per cent of all safrole seizures also took place in China in 2004.

Fig. 108: Origin* of ecstasy in 2002-2004



* Number of times a country was identified by other countries as a source country for ecstasy over the 2002-2004 period (N = 256) based on information provided by 60 countries

Source: UNODC, Annual Reports Questionnaire Data.

1.6.2. Trafficking

After huge increases in the 1990s, ATS seizures continue to decline in 2004...

Seizures of ATS declined by 11 per cent in 2004 to 28 tons (in kilogram equivalents), mainly reflecting lower seizures made in East and South-East Asia. The decline is even more marked over the period 2000-2004 over which seizures decreased by 80 per cent. Nonetheless, even now ATS seizures are almost 4 times higher than a decade earlier and 6 times as high as in 1990.

...due to lower seizures across East and South-East Asia

The proportion of seizures made in East and South-East declined from 73 per cent in 2000 to 25 per cent in 2004. Strong declines in ATS seizures over the 2000-2004 period were reported from China (-86 per cent), Singapore (-86 per cent), Brunei Darussalam (-73 per cent), Thailand (-79 per cent), Hong Kong Special Administrative Region of China (-76 per cent), Myanmar (-69 per cent), Malaysia (-48 per cent), Japan (-46 per cent), Philippines (-26 per cent) and Indonesia (-16 per cent). Seizures in the Lao PDR remained stable and increased in Cambodia, Viet Nam and Republic of Korea. The overall decline of seizures in that subregion suggests a sizeable reduction in production and trafficking, possibly as a consequence of improvements in law enforcement cooperation.

Seizures of some 20 tons of amphetamines (methamphetamine, amphetamine and other synthetic stimulants) were reported for 2004 of which most were made in the United States (15 per cent of total), followed by China (14 per cent), Belgium (13 per cent), Thailand (10 per cent), United Kingdom (8 per cent)[30], Bulgaria (7 per cent), Mexico (5 per cent), Philippines (4 per cent) and Netherlands (3 per cent).

Some 8 tons of ecstasy were reported seized in 2004. Canada and Belgium both account for 19 per cent of the seizures made, followed by Australia (17 per cent), the Netherlands (13 per cent) and United Kingdom (8 per cent)[31].

Methamphetamine continues to most widely seized ATS, followed by ecstasy

Over the 2000-2004 period, methamphetamine accounted for 62 per cent of all ATS seizures, amphetamine for 14 per cent and non-specified stimulants (including amphetamine, methamphetamine, methcathinone and other synthetic stimulants) 7 per cent. Substances of the ecstasy group accounted for the remaining 17 per cent. In 2004, the proportion of ecstasy as part of overall ATS seizures increased to 28 per cent and the proportion of amphetamine to 21 per cent.

While methamphetamine and amphetamine are, by far, the two most important substances in the amphetamines group, trafficking in methcathinone is signficant in a number of CIS countries (where it is known as ephedrone), in some parts of the United States, and, as a rather recent phenomenon, in South Africa. Methcathinone is usually domestically produced and trafficked.

Trafficking in fenetylline (captagon) continues to be considerable in the Near and Middle East. Fenetylline is often produced in clandestine laboratories in South-Eastern Europe (mainly Bulgaria) and trafficked via Turkey to Syrian Arab Republic, Jordan and Saudi Arabia.

In contrast to the ATS precursor trade which is international, trafficking in amphetamine and in methamphetamine continues to be largely intra-regional, although there are some exceptions (notably trafficking of methamphetamine from South-East Asia to Oceania).

Most ecstasy continues to be trafficked in Europe but with the development of illicit markets for the substance in other regions, trafficking of ecstasy to other regions has increased. However, of late production of ecstasy has been reported from North America, Oceania and South-East Asia. If ecstasy production in regions outside Europe rises, it is likely that, like for other ATS, ecstasy trafficking will become (again) increasingly intra-regional in nature.

Trafficking in methamphetamine

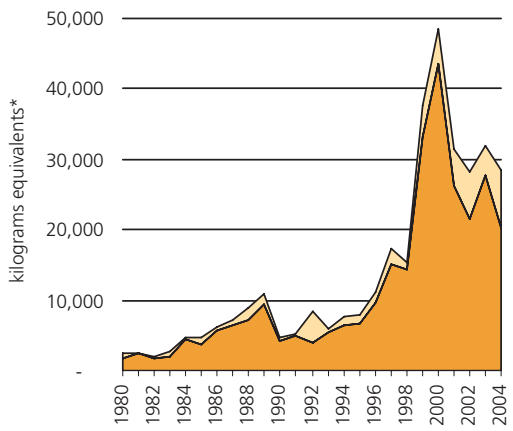
Despite decline in seizures, most methamphetamine continues to be trafficked in East and South-East Asia

Global seizures of methamphetamine fell by 70 per cent between 2000 and 2004 to 11 tons. This decline was entirely due to lower methamphetamine seizures made in East and South-East Asia (-82 per cent). This decline

[30] UK data refer to 2003.

[31] UK data refer to 2003.

Fig. 109: Seizures of amphetamine-type stimulants, 1980-2004



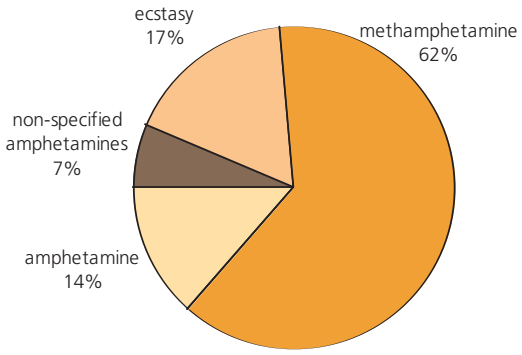
* Seizures reported in kilograms and in units;

A unit (pill) of ecstasy was assumed to contain on average 100 mg of MDMA; a unit of amphetamine/ methamphetamine was assumed to contain 30 mg of amphetamine/methamphetamine

** up until 1999 'other hallucinogens' are also included; the proportion of ecstasy in the total seems to have exceeded 90 per cent in most years (data for 2001-2004: 91 per cent-96 per cent of such a total)

Source: UNODC, Annual Report Questionnaire Data / DELTA

Fig. 110: Breakdown of ATS seizures, by substance, 2000-2004 (N = 34 tons p.a.)



Source: UNODC, Annual Report Questionnaire Data / DELTA

appears to have been a reflection of an underlying decrease in trafficking following the crack-down of several ATS markets (notably Thailand in 2003), some improvements in international precursor control, and better cooperation among law enforcement agencies across the region. A number of regional initiatives may have also contributed to stem the upward tide experienced in East and South-East Asia in the 1990s. Though the proportion of methamphetamine seizures made in East and South-East Asia declined from 89 per cent in 2002 to 76 per cent in 2003 and 58 per cent in 2004, global trafficking in methamphetamine remains concentrated in this area.

Most methamphetamine in South-East Asia is trafficked within the region and some to Oceania and North America. Methamphetamine from outside the region is only rarely seized. Authorities in the Republic of Korea identified the United States as a source country, in 2003 and 2004. The important trafficking routes are:

- from Myanmar to Thailand and to China, or from Myanmar to Lao PDR, for transport to Thailand or Cambodia or Viet Nam; smaller amounts also appear to leave Myanmar for India for local use in the north-eastern provinces;
- from China to Hong Kong SAR of China, Philippines, Malaysia, Republic of Korea, Japan;
- from Hong Kong SAR of China, to Japan, Australia and Guam (United States);
- from the Philippines to Republic of Korea, Malaysia, Brunei Darussalam, Taiwan Province of China, Japan, Australia, United States (including Guam) and Canada;
- from Thailand to Malaysia, to Taiwan Province of China, Republic of Korea, and to markets outside the region.

The most financially lucrative methamphetamine market in the region remains Japan. There are indications that methamphetamine continues being smuggled into Japan from China, Philippines, Taiwan Province of China as well as from Indonesia. US sources indicate that there have also been methamphetamine shipments from the United States as well as several shipments from Canada to Japan. While there are still suspicions that some of the methamphetamine found on the Japanese market emanated or was trafficked via the Democratic People's Republic of Korea (reported to UNODC in 2002/03), no new evidence emerged in 2004 or 2005.

Methamphetamine trafficking is rising in North America

The proportion of North America in global methamphetamine trafficking has been rising in recent years, from 10 per cent in 2002 and 21 per cent in 2003 to 38 per cent in 2004. Methamphetamine seizures increased

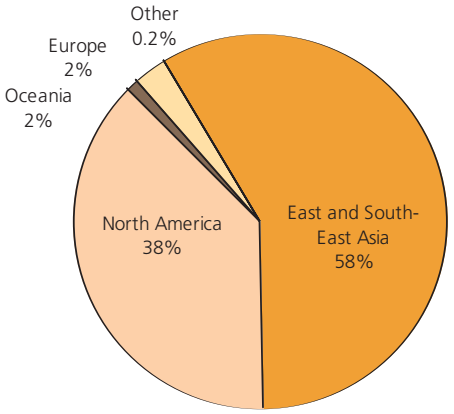
from 1.6 tons in 2002 to 4.6 tons in 2003 before falling slightly to 4.1 tons in 2004.

Trafficking in North America is mostly targeting the United States methamphetamine market. The bulk of the methamphetamine used in the United States is domestically produced and authorities in the United States sees a decline in the domestic supply. However, it appears that large laboratories have emerged in Mexico which are essentially supplying the United States market. The increase of methamphetamine seizures along the along the US Mexican border (1.1 tons in 2002, 1.7 tons in 2003 and 2 tons in 2004) would confirm this trend. Mexico reported to UNODC that 99 percent of local production in 2004 were destined for the US market. To a lesser extent, the United States market is also supplied from Canada.

Increasing seizures are reported – though from lower levels – in other regions

Methamphetamine seizures in Oceania, in Europe, in the Near and Middle East and in Africa have shown an upward trend over the last few years – albeit from low levels. In Oceania, on the other hand, methamphetamine seizures declined in 2004, which appears to be associated with some reductions of methamphetamine trafficking in Australia. Though methamphetamine seizures in Europe are still very small - Europe accounted for just 2 per cent of global methamphetamine seizures in 2004 - 20 European countries reported such seizures in 2004, up from 11 countries in 2000.

Fig. 111: Breakdown of methamphetamine seizures in 2004 (N = 10.9 tons)



Source: UNODC, Annual Report Questionnaire Data / DELTA

Trafficking in amphetamine

Most amphetamine continues to be seized in Europe

Amphetamine seizures increased to 6 tons in 2004, up from 5.7 tons a year earlier and 3.1 tons in 2000. Throughout the 2000-2004 period amphetamine seizures made in Europe accounted for more than 90 per cent of the world's total (96 per cent in 2004). However, this proportion for Europe may not be realistic as a number of countries outside Europe classified their amphetamine seizures under the broader category of 'amphetamine-type stimulants'.

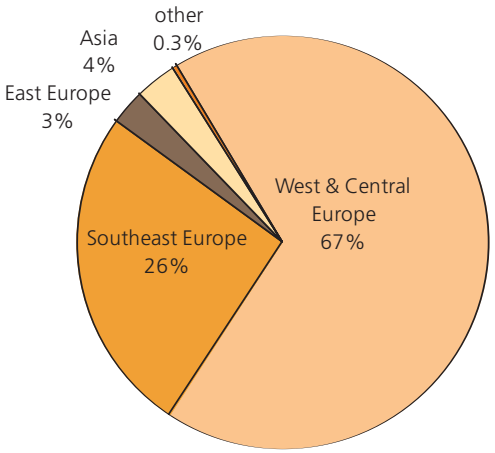
Europe's amphetamine seizures increased between 1980 and 1997, then declined until 2000 before rising again and exceeding by 2004 the previous record high of 1997. This pattern seems to reflect underlying trafficking activities as seen in a number of additional indicators, suggesting that amphetamine trafficking is, once again, increasing in Europe.

Though amphetamine seizures increased in West and Central Europe in recent years, the proportion of these seizures as part of global reported amphetamine seizures declined, from 86 per cent in 2000 to 67 per cent in 2004. Most of the increase took place in South-East Europe, with seizures rising from 7 per cent of the world's total to 26 per cent in 2004. This increase was mainly due to rising seizures reported by Bulgaria. There have also been increases in seizures reported by Poland while seizures in the Netherlands declined from their peak levels in 1998 and have been fluctuating at lower levels over the 2001-2004 period.

The Netherlands and Poland remained the most frequently mentioned source countries for seized amphetamine in 2004. This was, in particular, the case in West and Central Europe. In South-East Europe, in contrast, this position is held by Bulgaria although Bosnia and Herzegovina as well as Serbia and Montenegro appear to have emerged as source countries in this subregion as well. Most neighbouring countries of the Netherlands and Belgium identified the two as the main source countries. The same is true for Poland which is named as a primary source by most of its neighbours. All of this indicates that there are currently several production centres in Europe - producing for the local market and supplying amphetamine, primarily, to neighbouring countries.

The United Kingdom continues to be Europe's largest amphetamine market. It has the largest number of amphetamine users in Europe (as a rate and in absolute terms) and for the past twenty years, most amphetamine seizures have been reported from the United Kingdom. Over the 2000-2004 period, important quantities were also seized by the Netherlands and Bulgaria (11 per cent each of the world total), Germany (8 per cent), Sweden (6 per cent), Poland (4 per cent) and Belgium (4 per cent). Seizures for 2004 have not yet been reported by the United Kingdom. Assuming similar levels as a year earlier, the United Kingdom is likely to have topped the list again (some 26 per cent of the total) followed by Bulgaria (24 per cent), the Netherlands (10 per cent), Germany (9 per cent), Sweden (7 per cent), Poland (4 per cent), Norway (4 per cent) and the Russian Federation (3 per cent).

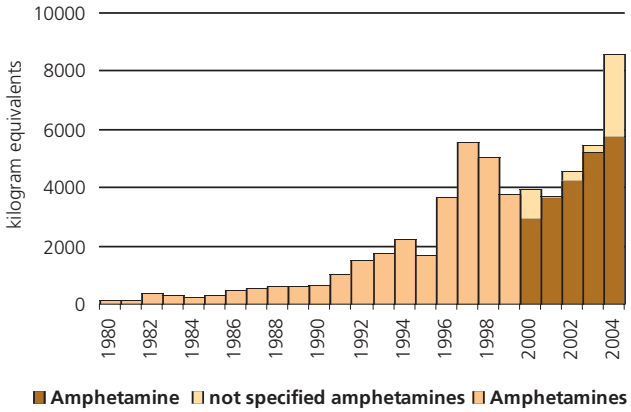
Fig. 112: Breakdown of amphetamine seizures* by sub-region in 2004 (N = 6 tons)



* in kilogram equivalents, assuming a dose/unit to be equivalent to 30 milligrams

Source: UNODC, Annual Reports Questionnaire Data.

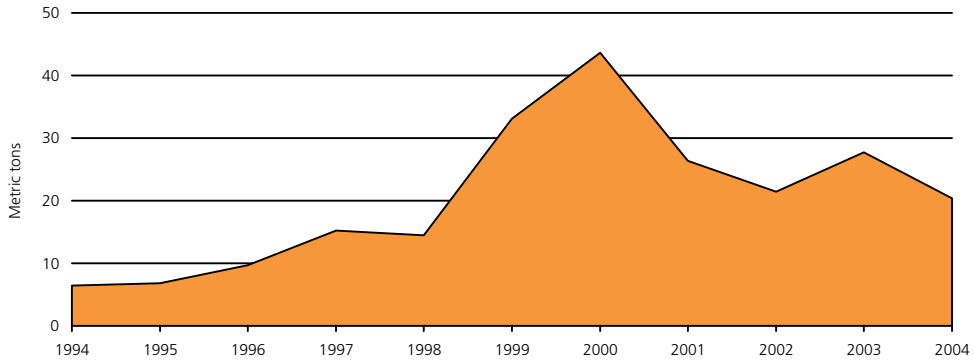
Fig. 113: Amphetamine seizures in Europe, 1980-2004



* in kilogram equivalents, assuming a dose/unit to be equivalent to 30 milligrams

Source: UNODC, Annual Reports Questionnaire Data.

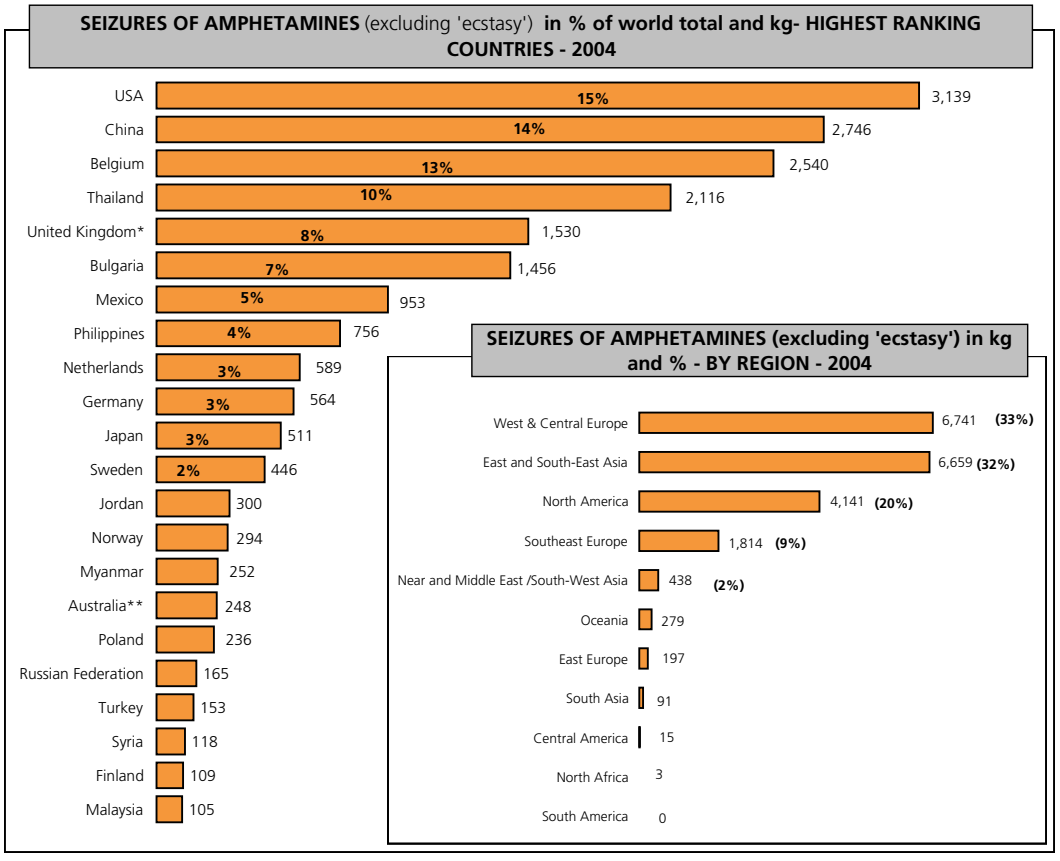
Fig. 114: Global seizures of amphetamines*, 1994 - 2004



* Excluding 'Ecstasy'

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Metric tons	6	7	10	15	14	33	44	26	21	28	20

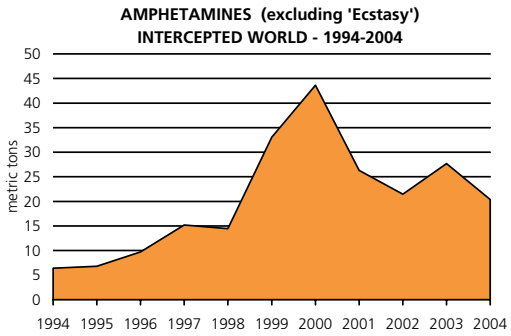
* metric ton equivalents. 1 unit assumed to be equivalent to 30mg.

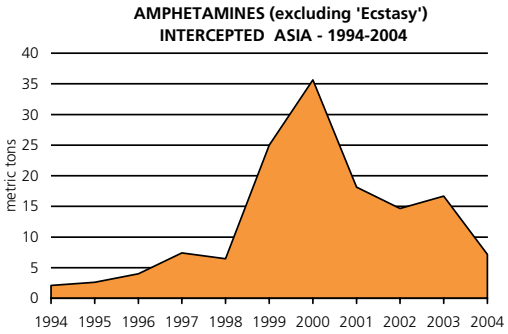


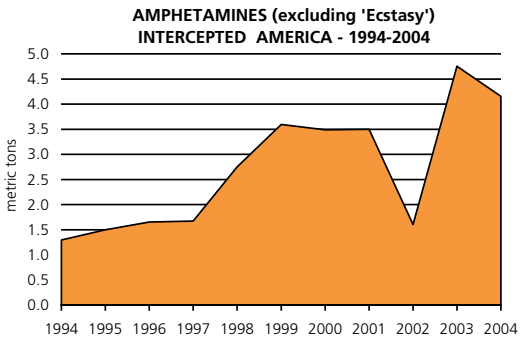
* data refer to 2003

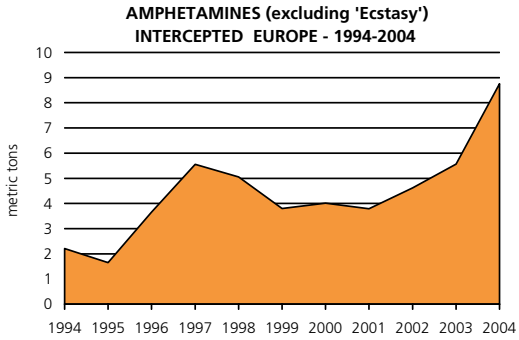
** total seizures reported by national as well as State & Territory law enforcement agencies which may result in double counting.

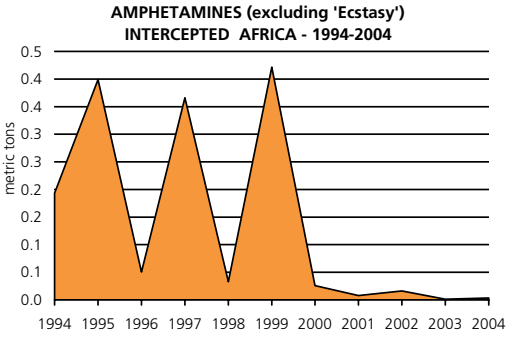
Fig. 115: Interception of Amphetamines, 1994-2004

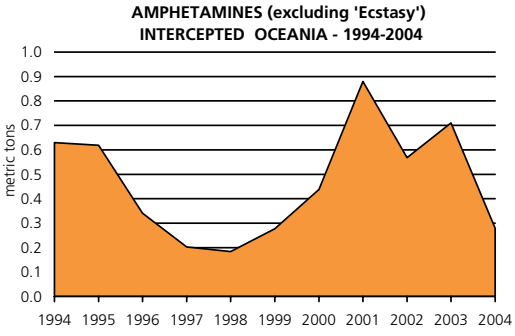




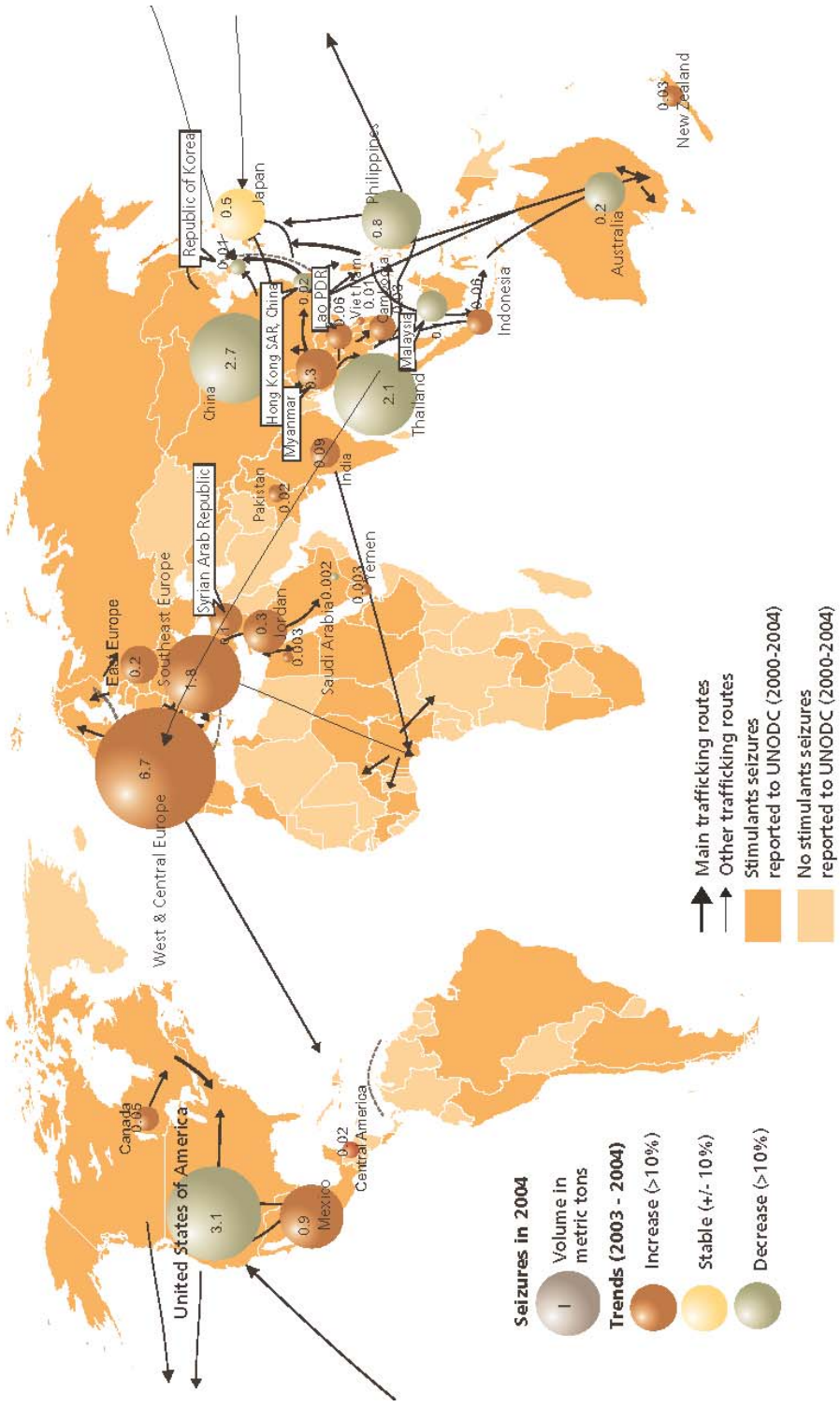








Map 20: Seizures of amphetamine-type stimulants (excluding ecstasy) 2003 - 2004: extent and trends (countries reporting seizures of more than 10 kg.)



Trafficking in Ecstasy

Ecstasy seizures rise to record high in 2004

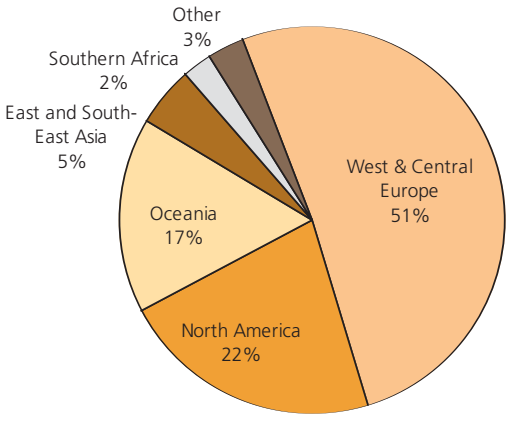
Reported seizures of ecstasy increased by 87 per cent in 2004 and reached a new record of 8 tons (expressed in kilogram equivalents), topping even peak levels recorded in 2002 by 20 per cent.

Seizures of ecstasy rose across all sub-regions, with the strongest increases reported from Southern Africa (+385 per cent) and the lowest in South America (+12 per cent). Over the last decade, ecstasy seizures rose almost 7-fold or 21 per cent per year, a far higher growth rate than for most other drugs.

Most ecstasy continues to be trafficked in Europe, followed by North America

Out of total seizures of 8 tons, 51 per cent were made place in Europe (mostly West and Central Europe), 22 per cent in North America, 17 per cent in Oceania and 5 per cent in East and South-East Asia. In addition, ecstasy seizures were reported – in order of importance - from Southern Africa, South-East Europe, the Near and Middle East, South America, the Caribbean, East Europe, North Africa, Central America, and South Asia.

Fig. 116: Breakdown of ecstasy seizures* by sub-region in 2004 (N = 8.1 tons)



* in kilogram equivalents, using a conversion ratio of 100 mg for an ecstasy pill

Source: UNODC, Annual Report Questionnaire Data / DELTA

Only three regions have not yet filed reports of ecstasy seizures with UNODC: Central Asia, West & Central Africa and East Africa.

European share in global ecstasy seizures continues to fall as production starts in other regions

The proportion of Europe in global ecstasy seizures declined over the last decade, from 81 per cent in 1994 to 51 per cent in 2004; in 2003, Europe still accounted for 58 per cent of global seizures. Together with other information, this suggests that, over the last decade, the expansion of ecstasy has been stronger in markets outside Europe. The proportion of ecstasy seizures rose between 1994 and 2004:

- From 17 per cent to 22 per cent in North America;
- From 0.3 per cent to 17 per cent in Oceania;
- From 0.2 per cent to 5 per cent in East and South-East Asia; and
- From 0.01 per cent to 2 per cent in southern Africa.

However, there was no linear upward trend in these regions. Notably in North America, the proportion of ecstasy seizures, after having increased from 17 per cent of global ecstasy seizures in 1994 to 33 per cent in 2000, fell to 22 per cent by 2004 reflecting an overall declining ecstasy market in North America in recent years.

The importance of the Netherlands and Belgium, traditional source countries for ecstasy appears to be declining, as production in other European countries grows. Outside Europe, ecstasy production has been reported from, inter alia, the United States, Canada, Australia, China, Indonesia, Hong Kong SAR of China, and South Africa.

The intra-regional distribution of ecstasy within Europe - like trafficking in amphetamine - seems to be carried out by a large number of relatively small drug trafficking groups that purchase the substance in the Netherlands and Belgium and traffic the drugs to local re-distribution centres across Europe.

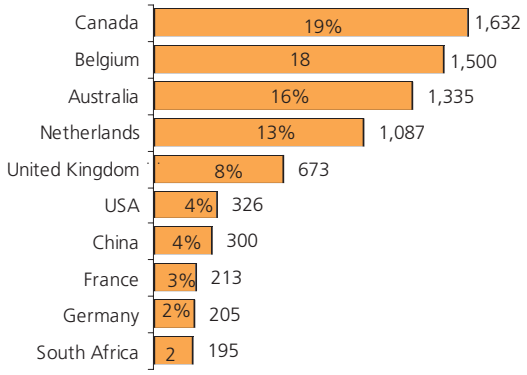
Trafficking of ecstasy from Europe to North America and some other regions has been – for years - controlled by criminal groups of Israeli origin, sometimes with links to Russia, other European countries and the USA. Israeli citizens have been part of international ecstasy trafficking networks in source, transit, and distribution countries and were found in several European countries to serve as brokers and transporters of ecstasy to the United States. These trafficking groups operate mainly outside Israel, though in some instances, they have been also involved in trafficking ecstasy from the Netherlands

and Belgium to Israel.

Criminal groups from the Dominican Republic continue to be involved in shipping ecstasy in significant quantities from Europe, often via the Caribbean to the United States as indicated by recent reports from Europol.

The strongest expansion in recent years, however, has been among Asian criminal groups, shipping precursors from China to Belgium and the Netherlands for manufacture into ecstasy, and then trafficking the end-product to Canada for further shipment to the United States; more recently such Asian groups, have started trafficking precursor chemicals from China and produce the ecstasy in Canada, to supply major markets in the United States. These groups are now also in the process of building nation-wide distribution channels in the United States, and are attempting to crowd out the Israeli/Russian groups who controlled much of the ecstasy business so far. The emergence of these trafficking networks may also explain why Canada, for the first time ever, reported most ecstasy seizures worldwide in 2004, accounting for 19 per cent of global ecstasy seizures, marginally ahead of Belgium. Most of these seizures were made in the process of detecting such clandestine laboratories.

Fig. 117: Seizures of ecstasy in % of world total and kg - highest ranking countries – 2004

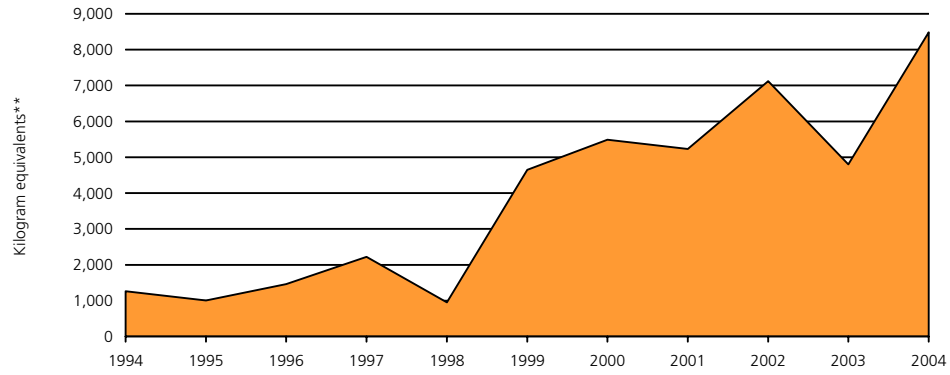


* total seizures reported by national as well as state & Territory law enforcement agencies which may result in double counting.

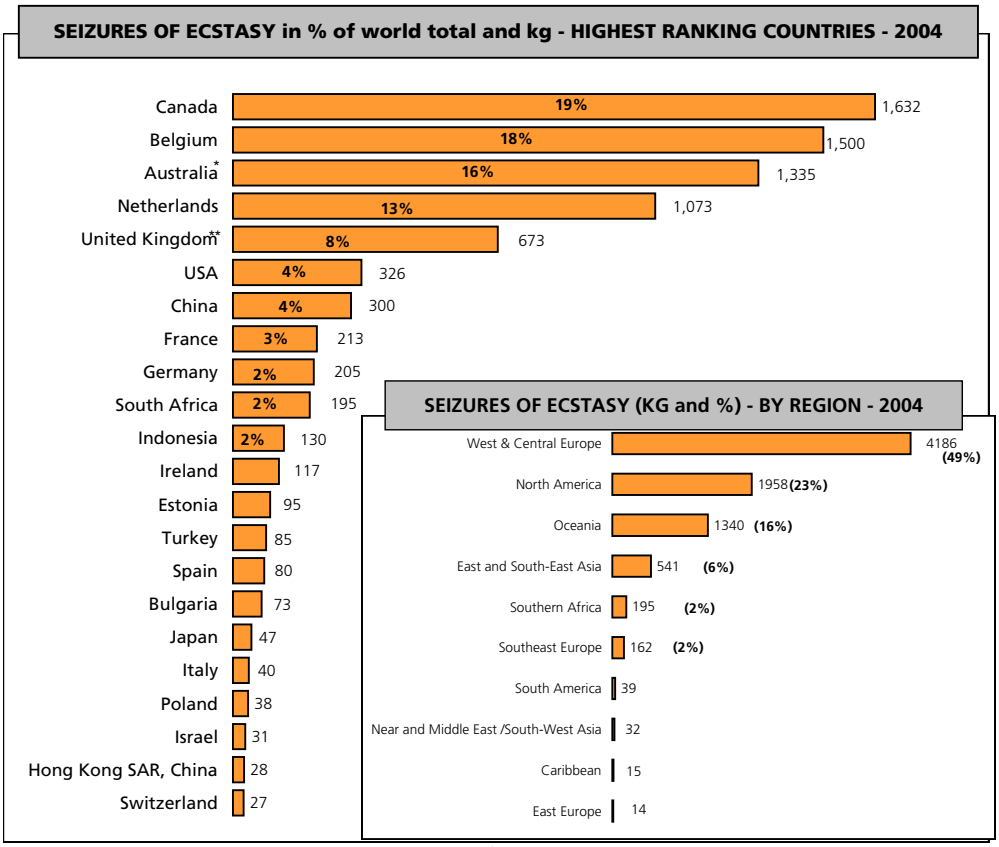
** data refer to 2003

The third largest ecstasy seizures worldwide were reported from Australia in 2004, accounting for 17 per cent of the total. Most of the ecstasy found on the Australian market used to come from Europe. However, of late, production of ecstasy in Australia appears to have increased, as reflected in the dismantling of several large-scale laboratories, with precursors imported from Asia, mostly China. In addition, some ecstasy seized in Australia also appears to originate from Asia. In 2004, Australian seizures of ecstasy exceeded those of the Netherlands (13 per cent of global seizures in 2004).

Fig. 118: Global seizures of ecstasy*, 1994 - 2004

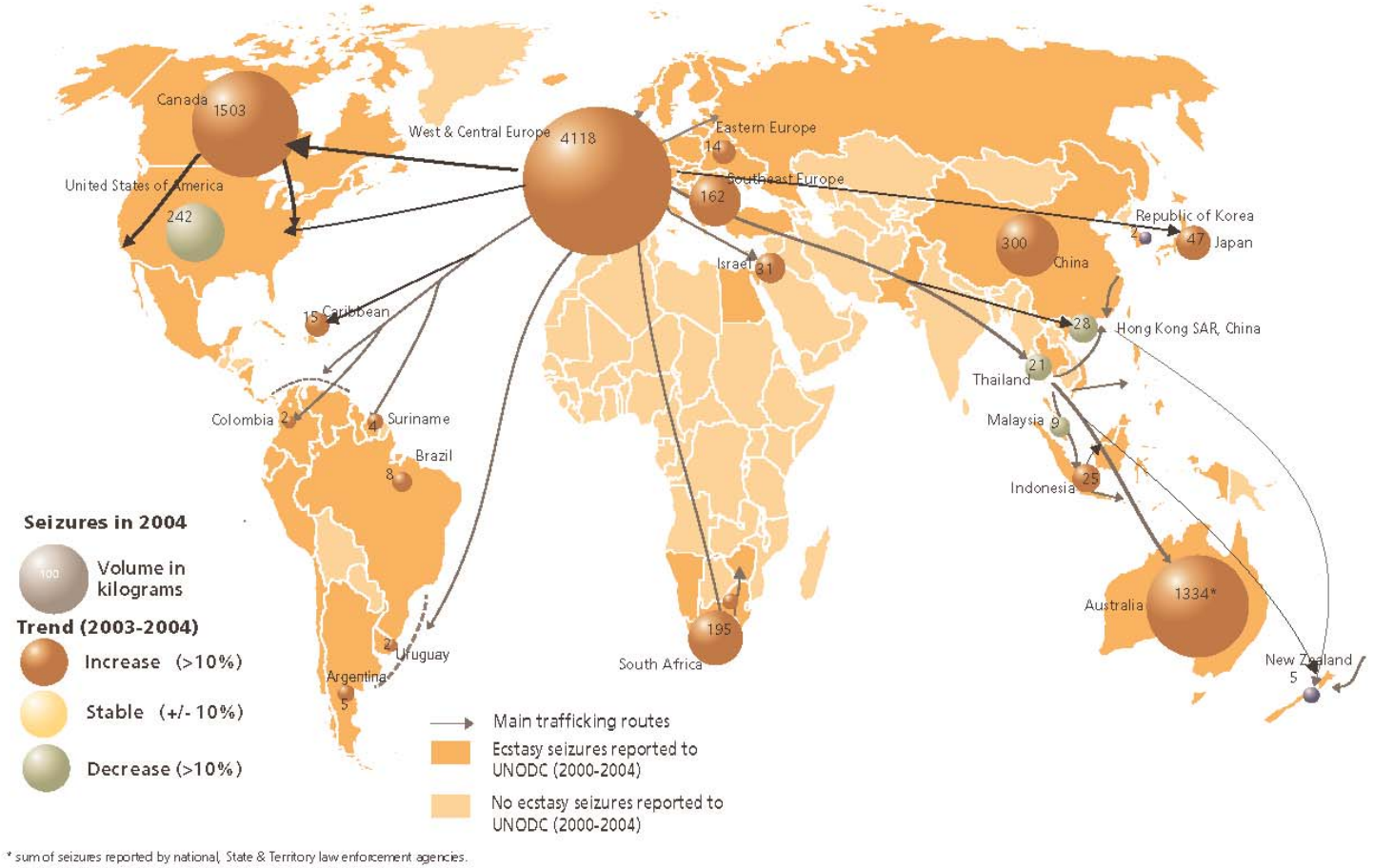


* Reporting on 'Ecstasy' seizures only started with the new ARQ in 2001; before, Ecstasy seizures were included under the category of 'hallucinogens other than LSD'. Trend data shown above refer to this broader category. In 2004, Ecstasy accounted for 95% of the seizures in this group.
** 1 unit is assumed to be equivalent to 100mg of MDMA.



* total seizures reported by national as well as State & Territory law enforcement agencies which may result in double counting.
** data refer to 2003.

Map 21: Seizures of Ecstasy (MDA, MDEA, MDMA) 2003 - 2004: extent and trends (countries reporting seizures of more than 10 kg.)



* sum of seizures reported by national, State & Territory law enforcement agencies.

Note: Routes shown are not necessarily documented actual routes, but are rather general indications of the directions of illicit drug flows.

1.6.3. Abuse

The group of amphetamine-type stimulants (ATS) encompasses amphetamines (amphetamine, methamphetamine), other synthetic stimulants (methcathinone, phentermine, fenetylline etc.) and substances of the ecstasy group (MDMA and related substances such as MDA).

Amphetamines and other synthetic stimulants

Most methamphetamine is used in South-East Asia and North America

Some 15 million people or more than 60 per cent of the world's amphetamines users live in Asia, most of whom are methamphetamine users in East and South-East Asia. The highest methamphetamine prevalence rates worldwide have been reported from the Philippines. For many years, Thailand reported the highest prevalence figures for methamphetamine use, but this has changed following the market crack-down in 2003.

Highest annual prevalence rates of amphetamines use at a the subregional level are reported from Oceania, followed by East and South-East Asia and North America. The Americas, notably North America, are the second largest market for amphetamines, with more than 4 million users.

Amphetamine use widespread in Europe; methamphetamine use limited

Europe is home to an estimated 2.7 million of amphetamines users. Although declines have been reported, the United Kingdom continues to be the largest amphetamine market in Europe. Methamphetamine use continues to be largely limited to the Czech Republic, Slovakia, Estonia and Latvia. Some reports suggest the emergence of methamphetamine use in the United Kingdom, albeit at very low levels.

South Africa emerging as ATS market

The main emergent ATS market in recent years, has been South Africa, where both methamphetamine and methcathinone are produced and used. Otherwise, amphetamines in Africa, like in South America, originate mainly from the diversion of various central nervous stimulants from licit sources.

Fenetylline, locally known as 'Captagon', smuggled into the region from South-East Europe, continues to play an important role in several countries of the Middle East.

Table 13: Annual prevalence of amphetamines use, 2003-2005

	No. of users	in % of population 15-64 years
EUROPE	2,700,000	0.5
West & Central Europe	2,185,000	0.7
South-East Europe	180,000	0.2
Eastern Europe	335,000	0.2
AMERICAS	4,320,000	0.8
North America	3,190,000	1.1
South America	1,130,000	0.4
ASIA	15,250,000	0.6
OCEANIA	610,000	3.0
AFRICA	2,000,000	0.4
GLOBAL	**24,880,000**	**0.6**

Above global average Below global average Around global average

Sources: Annual Reports Questionnaire data, various Government reports, reports of regional Bodies, UNODC estimates

Fig. 119 : Breakdown of amphetamines users by region

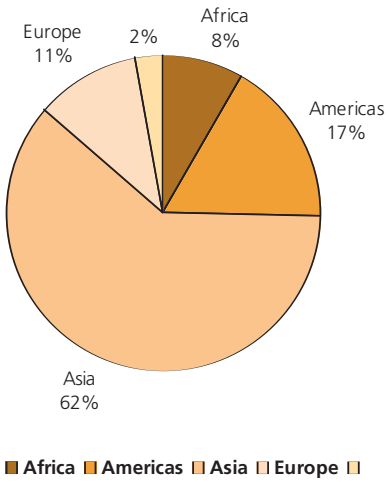
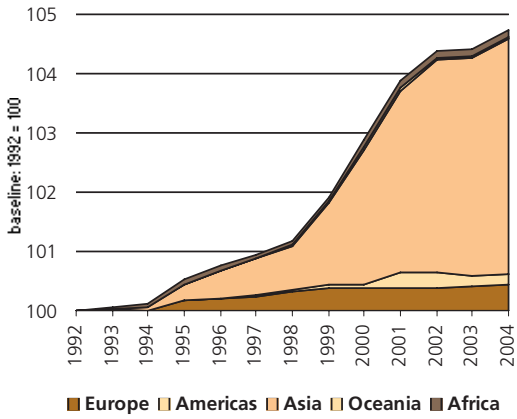


Fig. 121: Twelve-year drug use trends, as perceived by expert: ATS



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

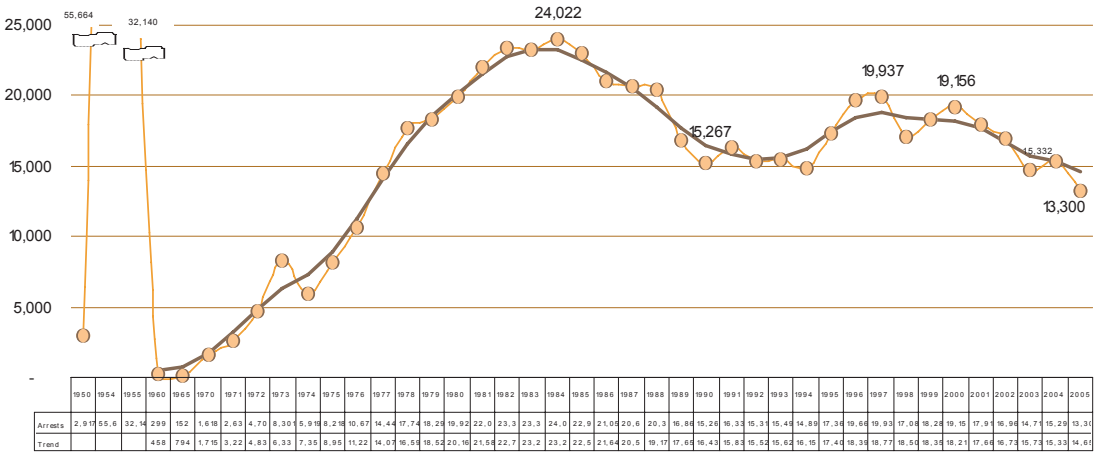
Global ATS market driven by Asia

Expert perceptions of drug use trends, suggest that most of the increase of ATS use - at the global level - was linked to higher use in Asia. The increase was particularly pronounced over the 1992-2002 period, but has since lost momentum. Nonetheless, the perceived drug use trend suggests that ATS use in Asia is still rising at higher rates than in any other region.

However, Japan appears to be an exception, as declines in methamphetamine use have been reported. The ongoing fall in reported violations against the Japanese Stimulants Law seem to confirm this view.

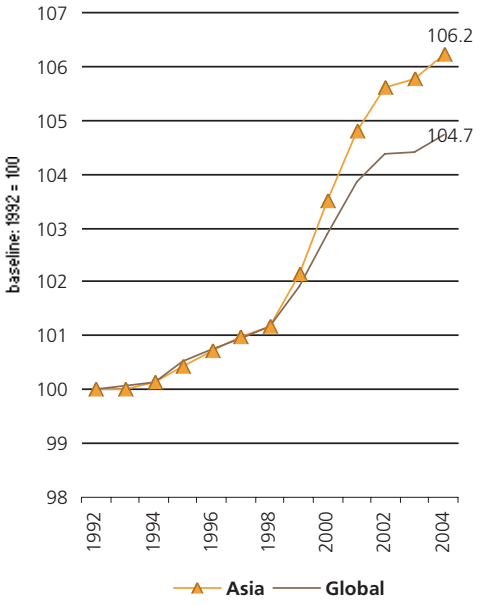
Further declines were also reported by the Government of Thailand. After a concerted effort against drug trafficking in 2003, significantly lower rates of methamphetamine use were reported. Even if official household survey data of 2005 reflect some under-reporting as a result of the severity of crack-down on methampheta-

Fig. 120: Reported violations against the Stimulants Law in Japan, 1950-2005



Sources: Ministry of Health and Social Welfare, National Police Agency of Japan, UNODC, Annual Reports Questionnaire Data and Statement of the National Police Agency of Japan to the Commission on Narcotics Drugs, March 2006.

Fig. 122: Twelve-year ATS use trends as perceived by experts: Asia



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

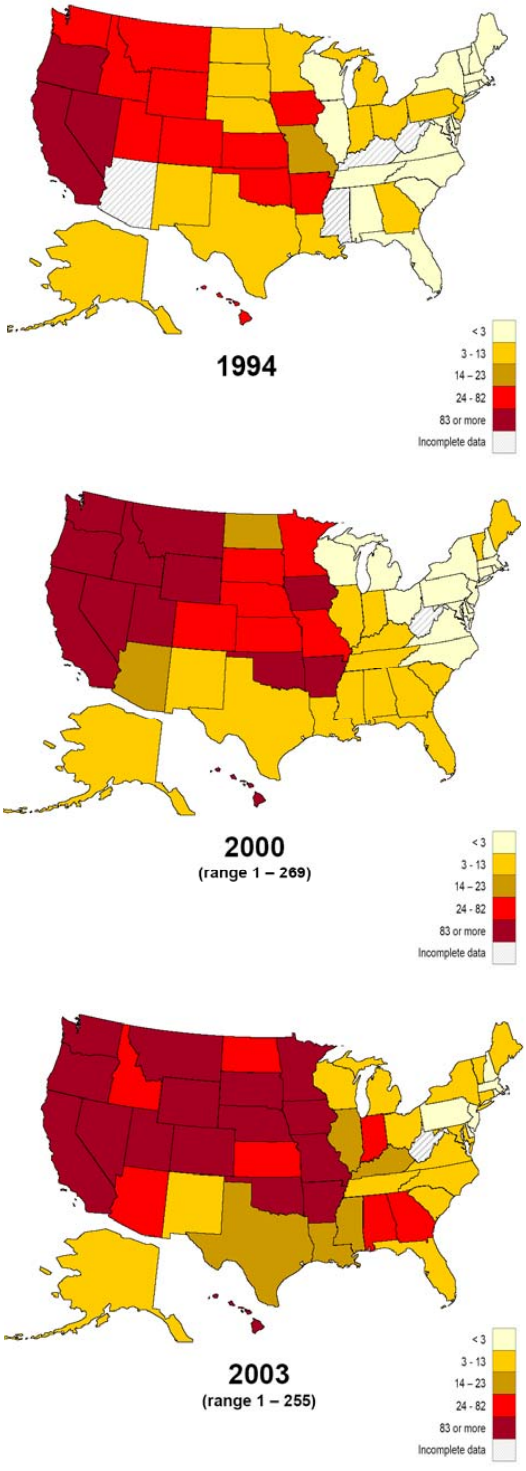
mine, all other available indicators (including treatment data and arrest data) point to sizeable drop in the number of ATS users in the country.

Use of ATS in the Americas reported stable but treatment demand has grown

In 2004, expert perceptions of ATS use indicated a fairly stable trend for the Americas. In the United States, school surveys, an important indicator of emerging drug use problems, have shown declines and general population survey indicate a stable market. However, treatment demand for methamphetamine abuse has increased dramatically.

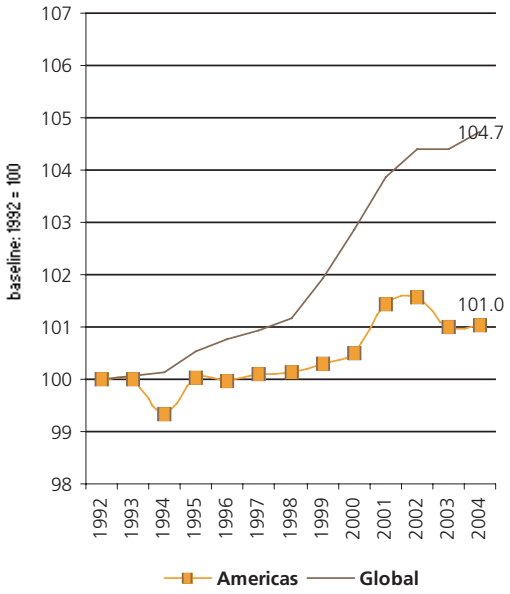
Against the background of such diverging indicators, it is difficult to gauge the direction in which the methamphetamine market in the United States is actually moving. What is, however, evident is that there is an ongoing geographical spread of methamphetamine across the country. While this used to be a localized problem in the West of the United States (California, Nevada and Oregon), abuse has gradually spread eastwards over the last decade.

Map 22: Primary methamphetamine/amphetamine admission rates by State: 1994-2003 (per 100,000 population aged 12 and over)



Source: Treatment Episode Data Set (TEDS), 1993-2003.

Fig. 123: Twelve-year ATS use trends as perceived by experts: Americas



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

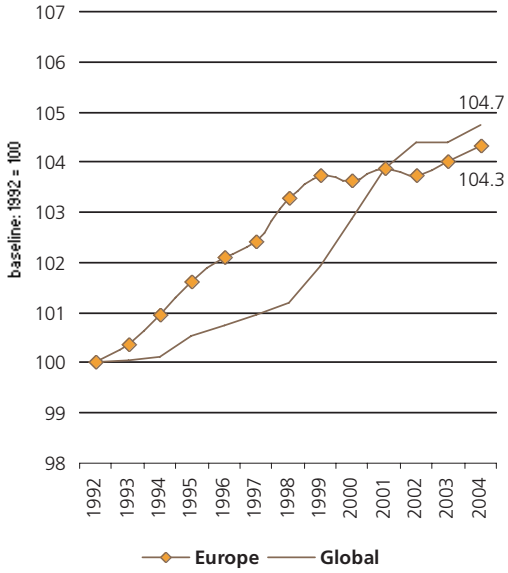
ATS drug use in Europe perceived to be growing

ATS use in Europe is mostly amphetamine use. After strong increases in the 1990s, the overall use level has been relatively stable and below the global average. This may, however, change soon, as increases in amphetamine use have been reported since 2002. This reflects ATS use in Germany, Italy and a large number of Central and East European countries, while a number of other West European countries, including the United Kingdom, France, the Nordic Countries as well as Spain and Portugal reported stable or declining levels.

ATS use in Africa remains constant – except for South Africa

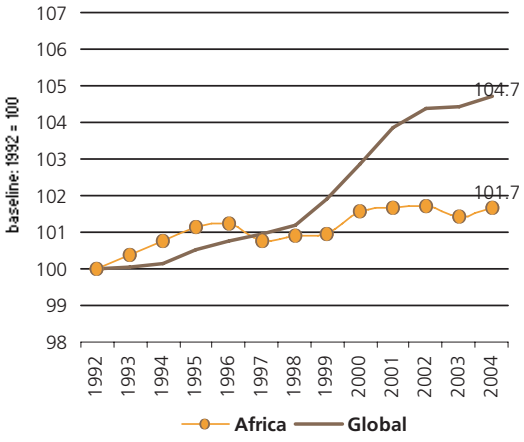
ATS use does not seem to be a growing problem in Africa. It grew in the 1990s, up until 1996, but seems to have been rather stable in subsequent years, possibly a reflection of some improvements in the control regimes of a number of countries to prevent diversion of licit ATS on to the market. The main exception here is South Africa which reported growing levels of both methamphetamine and methcathinone abuse in recent years, coming mainly from local clandestine manufacture.

Fig. 124: Twelve-year drug use trends as perceived by experts: Europe



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Fig. 125: ATS use trends as perceived by experts: Africa

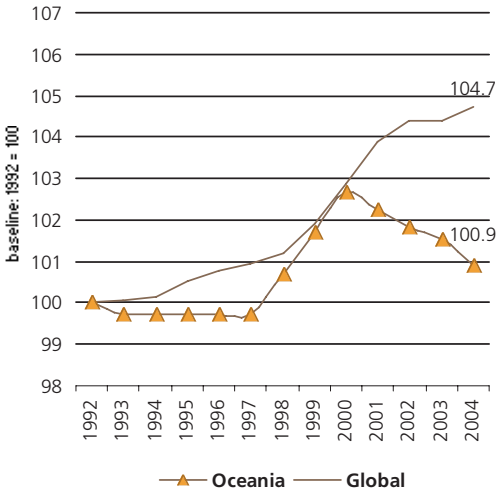


Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

In Oceania, ATS use is perceived to be declining significantly

Although Oceania continues to have the highest ATS prevalence rate of any region, use of amphetamines have shown significant declines over the past four years. Data based on the testing of arrested persons across Australia (Drug Use Monitoring in Australia) show a fairly stable trend for 2005.

Fig. 126: Twelve-year ATS use trends as perceived by experts: Oceania



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, UNODC Field Offices, UNODC's Drug Abuse Information Network for Asia and the Pacific (DAINAP), EMCDDA, CICAD, HONLEA reports and local studies.

Ecstasy use is still concentrated in Europe, though gaining in importance in other regions

There are more than 3 million ecstasy users in Europe, accounting for almost 40 per cent of all ecstasy users worldwide. The annual prevalence rate of ecstasy use is highest in West & Central Europe (0.9 per cent of the population age 15-64), exceeding that of North America (0.8 per cent), reflecting the decline of ecstasy use in North America over the last few years. While drug use trends in most of Western Europe are largely stable, ecstasy use continues to rise in several East and South-East European countries as well as Italy.

Prevalence rates for ecstasy are still highest in Oceania (3 percent) and increases have been reported from that region. While prevalence of ecstasy continues to be low in the whole of Asia (0.1%), East and South-East Asia has been the main emerging ecstasy market over the last few years. In addition, some countries in South America have reported rising levels of ecstasy use.

Ecstasy use declines strongly in North America

The most impressive decline in ecstasy use has been reported from countries in North America. Following strong increases in the late 1990s, school surveys in both

Table 14: Annual prevalence of ecstasy use, 2003-2005

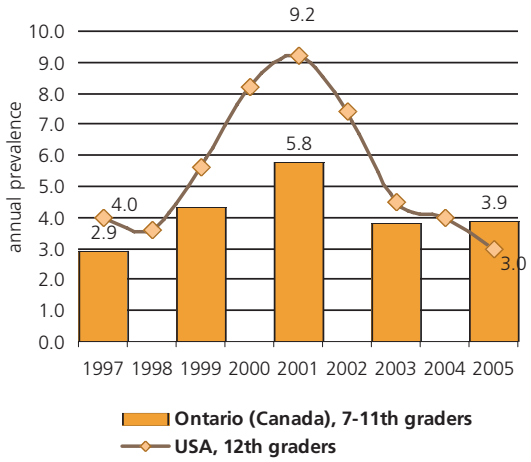
	No. of users	in % of population 15-64 years
EUROPE	3,177,000	0.6
West & Central Europe	2,815,000	0.9
South-East Europe	196,000	0.2
Eastern Europe	167,000	0.1
AMERICAS	2,686,000	0.5
North America	2,165,000	0.8
South America	522,000	0.2
ASIA	2,990,000	0.1
OCEANIA	616,000	3.0
AFRICA	191,000	0.04
GLOBAL	**9,660,000**	**0.2**

Above global average Below global average Around global average

Sources: Annual Reports Questionnaire data, various Government reports, reports of regional Bodies, UNODC estimates

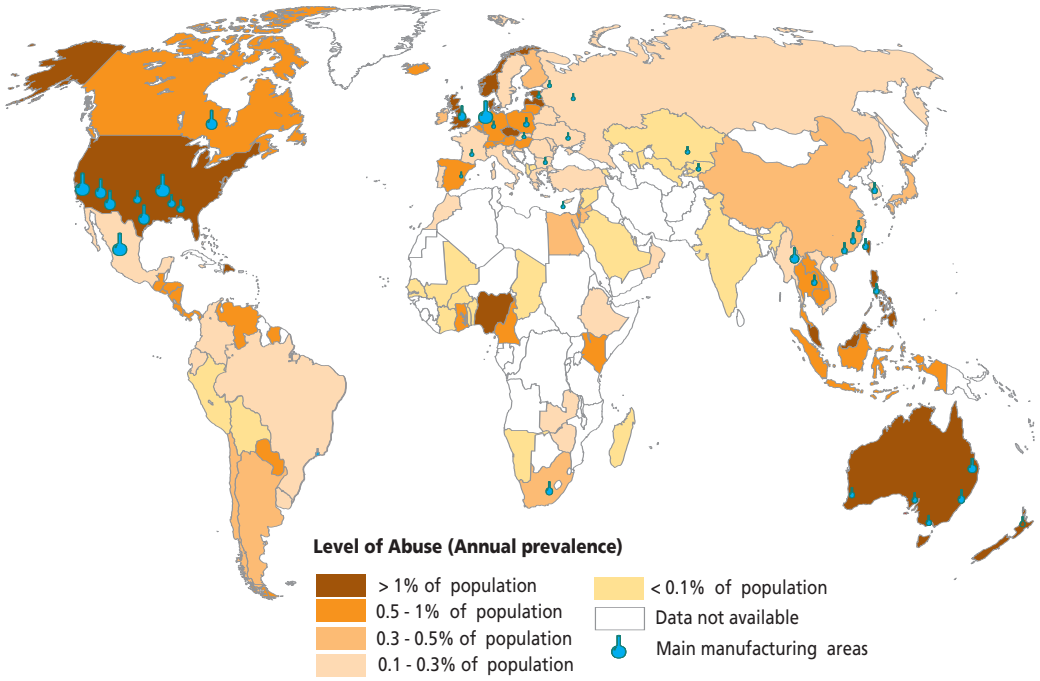
Ontario, Canada, and in the United States showed significant declines in the levels of ecstasy use since 2000. The decline seems to have been associated with a lower availability of the drug, due to lower levels of ecstasy trafficking from Europe, as well as with the perception of an increased risk of potential users of the health hazards related to ecstasy use.

Fig. 127: Ecstasy use among high-school students in the USA and in Canada (Ontario)

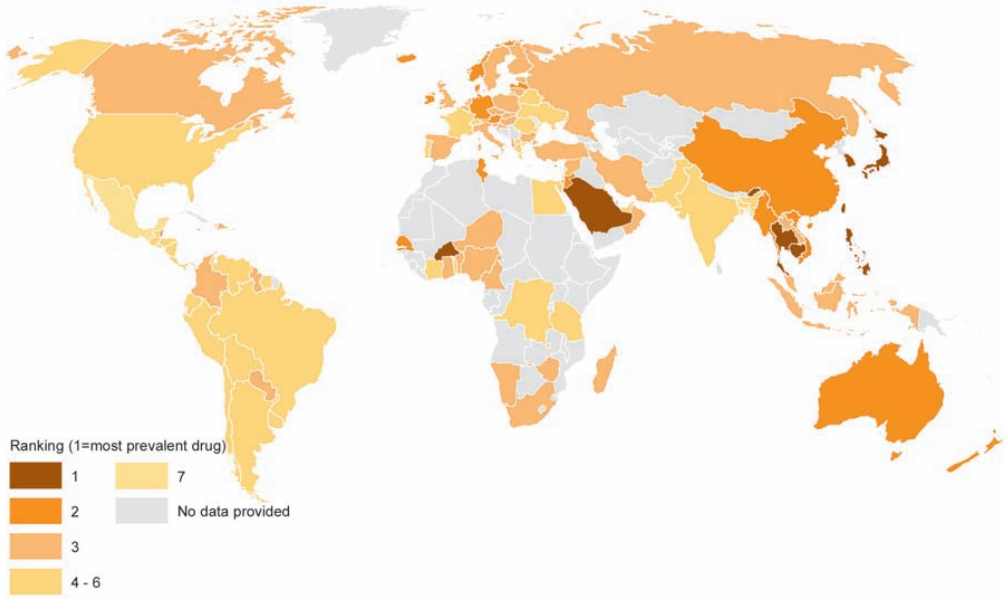


Sources: NIDA, Monitoring the Future – Overview of Key Findings 2005 and CAMH, Drug Use among Ontario Students, Toronto 2005

Map 22: Use of amphetamines in 2004 (or latest year available)

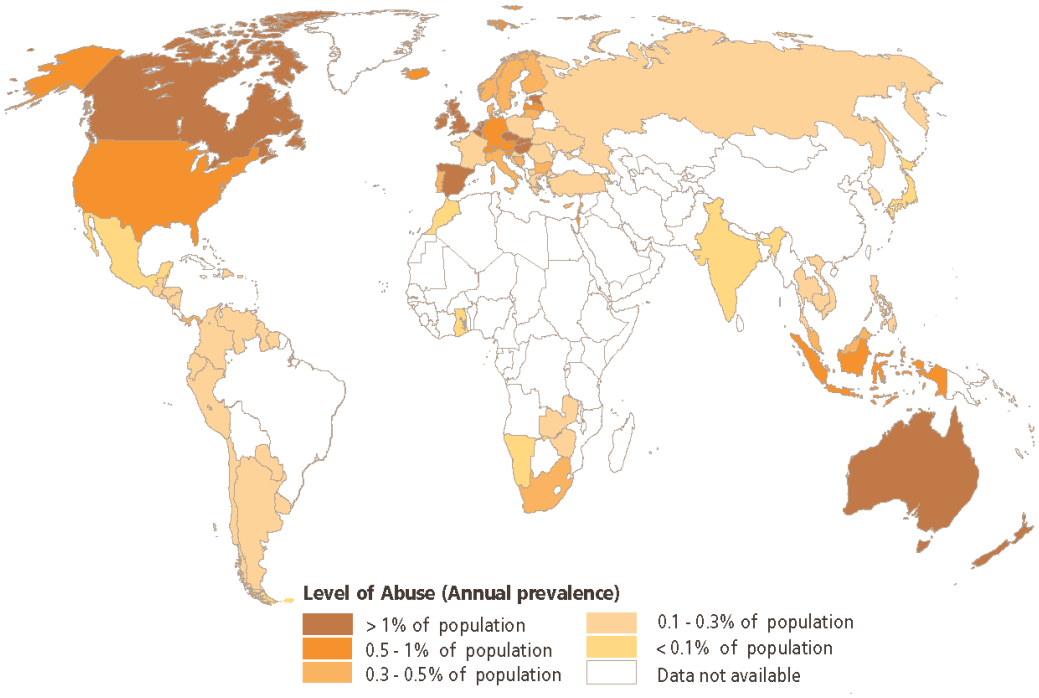


Map 23: Ranking of amphetamine-type stimulants in order of prevalence in 2004 (or latest year available)

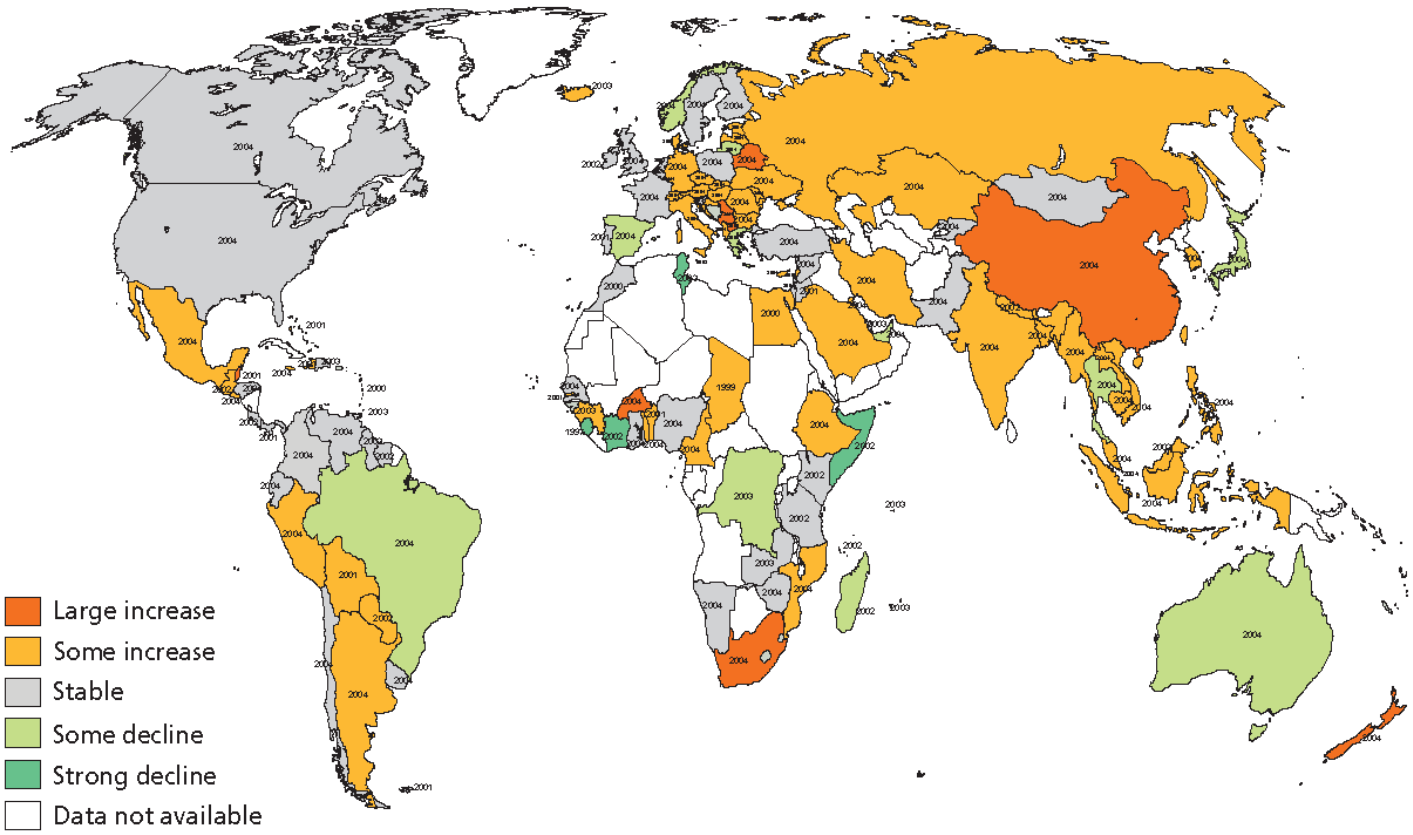


Sources: UNODC Annual Reports Questionnaires data, National Household Surveys on Drug Abuse, UNODC Rapid Assessement Studies, Council of Europe, ESPAD.

Map 24: Use of ecstasy in 2004 (or latest year available)

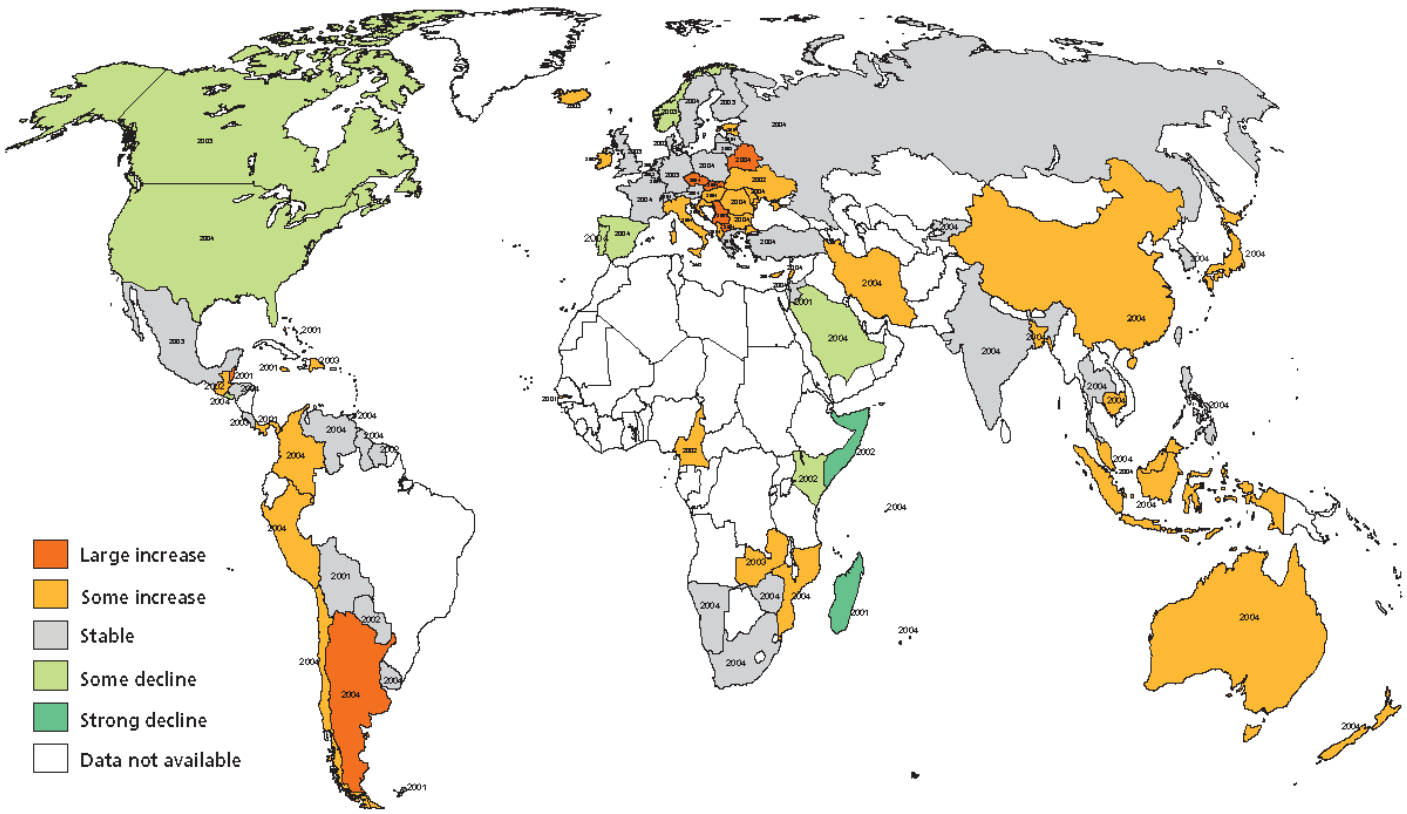


Map 25: Changes in abuse of amphetamine-type stimulants (excluding ecstasy), 2004 (or latest year available)



Sources: UNODC Annual Reports Questionnaires data, UNODC (Regional Centre Bangkok) Epidemiology Trends in Drug Trends in Asia (Findings of the Asian Multicity Epidemiology Workgroup, National Household Surveys submitted to UNODC, United States Department of State (Bureau for International Narcotics and Law Enforcement Affairs) International Narcotics Control Strategy Report;Bundeskriminalamt (BKA) and other Law Enforcement Reports.

Map 25: Changes in the use of ecstasy (MDA, MDEA, MDMA), 2004 (or latest year available)



Sources: UNODC Annual Reports Questionnaires data, UNODC (Regional Centre Bangkok) Epidemiology Trends in Drug Trends in Asia (Findings of the Asian Multicity Epidemiology Workgroup, National Household Surveys submitted to UNODC, United States Department of State (Bureau for International Narcotics and Law Enforcement Affairs) International Narcotics Control Strategy Report;Bundeskriminalamt (BKA) and other Law Enforcement Reports.

2. CANNABIS: WHY WE SHOULD CARE

2. Cannabis: Why we should care

2.1. Introduction

The global community is confused about cannabis. On the one hand, cannabis is controlled with the same degree of severity as heroin and cocaine under the Single Convention on Narcotic Drugs, 1961. Virtually every country in the world is a party to that Convention. On the other hand, however, cannabis offences are treated far more leniently than those related to other narcotic drugs in many countries. A conflicting message is thus sent to the population and it is no wonder that public opinion becomes confused.

Rather than confronting this schism head-on, cannabis has been allowed to fall into a grey area. Technically illegal but widely de-prioritized, the drug has grown in popularity at a rate outpacing all others while simultaneously enriching those willing to break the law. A global blind-spot has developed around cannabis, and in this murk the plant itself has been transformed into something far more potent than in the past. Suddenly, the mental health impact of cannabis use has been thrown into sharp relief, and the drug with which the world has felt so familiar seems strange once again.

Coming to terms with cannabis is important because it is, by quite a wide margin, the world's most popular illicit drug. An estimated 4 per cent of the world's adult population consumes it each year, more than all the other illicit drugs combined. In some countries, more than half of the young people polled have tried it. Mankind has cultivated the plant for a variety of reasons for centuries, and it has been the subject of reams of academic research in the last 50 years alone, including recent studies of its therapeutic applications.

Given this wealth of knowledge and experience, it is rather surprising that many basic facts about the drug remain unknown. Concerned with the situation, Member States requested UNODC, in General Assembly resolution 59/160, to prepare a global market survey on cannabis. However, when it comes to the mechanics of the market, the world's biggest illicit drug is actually the least understood. In contrast to drug crops like coca and opium poppy, very little is known about the extent of cannabis cultivation around the world. In fact, few Governments can confidently give an estimate of the scale of cultivation in their own countries. In the United States, for example, a country with both resources and a strong infrastructure for drug control, official estimates of the extent of domestic cultivation vary by more than a factor of six. Even if the number of hectares under cannabis were documented, there has been little study of how much drug product these fields would yield. As a result, global production estimates remain highly tentative.

There are several reasons why these questions are so difficult to answer. Unlike other drug crops, cannabis can be grown virtually anywhere, including indoors, and there are very few countries where it can be definitively said that cannabis is *not* cultivated. Moreover, cannabis is both easy to grow and highly productive, yielding a large quantity of ready-to-use drug per plant. As a result, many users can, and do, produce their own supply. Current illicit crop monitoring techniques, such as satellite surveillance, are of little use in assessing cultivation taking place in private homes and small plots in communities spread across the globe. In addition, there remain unanswered questions about basic aspects of cannabis use, such as the precise amounts bought and consumed by users.

Many of these issues could be cleared up with appropriate targeted research. The fact that this research has not been done reflects the global ambiguity on cannabis. These political attitudes reflect popular perceptions that cannabis is different from other controlled substances. Indeed, many of the risks associated with other illicit drugs are not an issue with cannabis. It is nearly impos-

sible to die of an overdose of cannabis. Because it is relatively cheap in most markets, crimes associated with acquiring money for cannabis dependency are limited. In many parts of the developed world, cannabis is regarded as a soporific, and the behaviour of the intoxicated as humorous, not dangerous. For many, it is a point of faith that cannabis is harmless, the victim of relentless disinformation.

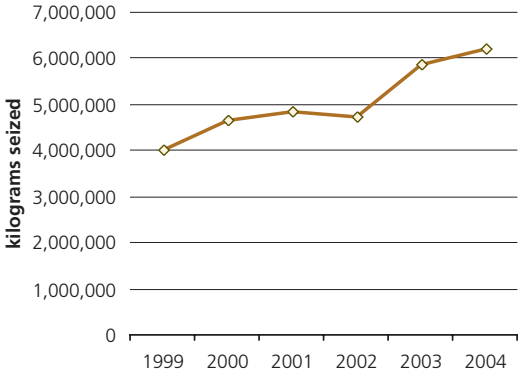
It is true that much of the early material on cannabis is now considered inaccurate, and that a series of studies in a range of countries have exonerated cannabis of many of the charges levelled against it. But the latest research indicates that the pendulum may have swung too far in the opposite direction. There are serious mental health consequences associated with cannabis, including a significant risk of dependency, precipitation and aggravation of psychosis, and acute dysphoric episodes. These risks appear to be higher for people who start consuming cannabis during adolescence. Each year, thousands of people seek medical attention for problems related to their cannabis use, and this number appears to be growing. Cannabis is not the harmless herb often portrayed, but a psychoactive drug that deserves to be taken seriously.

One reason these serious effects are only being appreciated now is that they appear to be related to the growth of high-potency cannabis in many countries where such research is commonly done. For the last several decades, cannabis breeders and cultivation experts have laboured to transform the plant, creating a much more potent and productive version of the drug previously reviewed. These developments were reviewed, along with other aspects of the cannabis market, in a double issue of the *Bulletin on Narcotics* (Volume XLIX, Nos.1 and 2, 1997; Volume L, Nos.1 and 2, 1998). The situation has advanced considerably since that time. High-potency cannabis may be responsible for the growing number of people seeking help for cannabis problems in developed countries around the world. Although most of the cannabis consumed globally is grown the traditional way, the problems associated with the 'new' cannabis may simply be large-print versions of issues not recognized before.

2.2. The world's biggest drug market is growing and uncharted

All available indicators suggest that global cannabis production, after having fallen in the late 1980s (mainly due to large-scale eradications in Latin America), rose again in the 1990s and continues rising in the new millennium. The volumes of cannabis seized by the police internationally have been increasing since the early 1990s, and surveys show that global demand has also increased. An estimated 162 million people used cannabis in 2004, over 10 per cent more than in the late 1990s. According to expert opinions solicited from Member States in 2004, far more countries felt that cannabis use was increasing (59 per cent of 97 countries responding) than declining (13 per cent) in 2004. In the last decade, the consensus is that cannabis use has been growing faster than the use of cocaine or opiates.

Fig. 1: Global cannabis seizures



Sources: Annual Reports Questionnaire Data.

Exactly how widespread is cannabis cultivation? One way to find out is to ask the law enforcement authorities in every country in the world whether cannabis is grown in their country, and this is precisely what the UNODC does. Each year, UNODC receives responses from Member States to its Annual Reports Questionnaire (ARQ), a survey of national Governments on their local drug situations. The ARQ contains questions about the extent of cannabis cultivation and use. Most are unable to give estimates on the extent of cannabis cultivation in their countries, and those that do often give questionable responses. But quite a few admit that cannabis is produced in their countries, and their other responses are revealing as well.

Over the 1994-2004 period, 82 countries provided UNODC with cannabis production estimates. For comparison, only six provided estimates for coca-leaf

Types of cannabis

Several drug products can be produced from cannabis, falling into three main categories:

- 'herbal cannabis', the leaves and flowers of the plant, also known as 'marijuana', 'ganja', and a host of other names;
- 'cannabis resin', the pressed secretions of the plant, commonly referred to as 'hashish' in the Western countries or 'charas' in India.
- 'cannabis oil'.

Herbal cannabis is most popular in North America and most of the rest of the world, while cannabis resin is most popular in much of Europe and a few traditional resin-producing regions.

production. But the fact that a country did not provide an estimate does not mean that no cultivation exists, as some countries simply lack the capacity to come up with accurate estimates. Luckily, there are other ways of identifying cannabis producing countries.

In the ARQ, Member States are also asked to identify the national source of the cannabis consumed in their countries. This evidence is often based on considerable experience in the field, and its value should not be underestimated. On this basis, 142 producer countries can be identified.

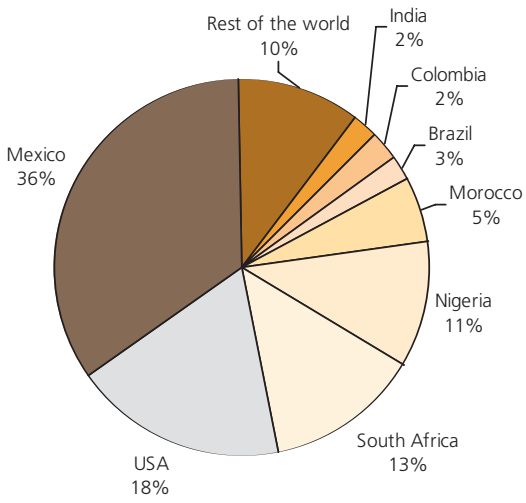
A third list of producer countries can be generated by singling out those that report the seizure of whole cannabis plants. It is extremely inefficient to transport whole plants internationally, as only certain parts are useable as a drug. Thus, when a whole plant is seized, it is very likely that it was locally produced. Seizures of whole cannabis plants were reported in 141 countries during the 1993-2004 period. Combining these three lists results in the identification of some 176 countries and territories where cannabis is produced, out of 195 countries reporting (90 per cent).

Of course, evidence of some cultivation does not mean the practice is large in scale. Many of these 176 countries produce primarily to satisfy local demand, but there are a number of countries that produce for mass export. For example, Paraguay produces much of the herbal cannabis consumed in its neighboring countries, and European production hubs include Albania and the Netherlands. Much of the world's resin supply comes from Morocco and Afghanistan. Other significant exporters include:

- in Africa: Nigeria, South Africa, Malawi, Lesotho, Swaziland
- in the Americas: Mexico, Canada, Jamaica, Colombia
- in Central Asia: Kazakhstan, Kyrgyzstan
- in the Middle East: Egypt, Lebanon
- in South Asia: India, Pakistan
- in Southeast Asia: Cambodia, Thailand, Philippines

More cannabis herb is seized, and it is seized in a wider range of locations, than any other drug in the world, although 90 per cent of global seizures by weight occur in just eight countries. Global cannabis herb seizures were over 6,000 metric tons in 2004, and 135 countries reported seizures of cannabis herb, more than for cocaine (119), heroin (114), cannabis resin (83), ecstasy (69), and amphetamines (47). Cannabis herb seizures have been rising continuously over the past decade, and were 162 per cent higher in 2004 than in 1994.

Fig. 2: Country shares of global herbal cannabis seizures in 2004



Sources: Annual Reports Questionnaire Data.

In recent years, most of global cannabis herb seizures have occurred in North America (with Mexico, United States, and Canada accounting for 52 per cent in 2004), usually followed by Africa, Latin America, and Europe. This has not always been the case: North America was only responsible for 32 per cent of global seizures in 1990. As the chief supplier to the North American market, Mexico is the perennial world leader in cannabis seizures, seizing 2,164 tons or 35 per cent of the global total in 2004. Africa's share has been increasing and Latin America's declining over the last 15 years.

But seizure figures also depend on the attention given by national law enforcement authorities to drug interdiction. While seizures give an idea of the minimum of the amount of the drug present in a society, the lack thereof does not discount the possibility of substantial markets, and it is never clear how much the tip constitutes of the iceberg. Global seizure figures do show that cannabis is everywhere, though the specifics of any given market remain rather obscure. The following quick tour of cannabis throughout the world underscores the diversity and the ubiquity of this drug.

Cannabis is everywhere

North America: the world's biggest cannabis market

In financial terms, there can be little doubt that North America constitutes the world's largest cannabis market. With high prices and a large user base, the North American market alone has been valued at US$ 10 billion to 60 billion, depending on the underlying production estimates. Most of this demand is satisfied by North American production.[1] It is also one of the best understood markets, due the attention paid to the issue by the United States government in particular. Estimates made available to UNODC suggest that North America accounts for about one third of global production, or 14,000 metric tons.

Judged simply on the basis of seizures, Mexico would appear to be the largest herbal cannabis producer in the world, responsible for a reported 36 per cent of the cannabis seized globally in 2004, over 2,000 metric tons. Cannabis production was estimated at 13,500 tons in 2003, declining to 10,400 tons in 2004, with a corresponding decline in cultivation area from 7,500 hectares to 5,800 hectares.[2]

Such wide-scale production calls to mind images of sprawling cannabis plantations, but, remarkably, most Mexican cannabis production occurs in small concealed plots averaging less than 1,000 square metres.[3] This is due to the country's intensive eradication programme, which destroyed an estimated 31,000 hectares in 2004. If these estimates are correct, upwards of 80 per cent of all the cannabis cultivated in Mexico is destroyed each year, and the large United States market is primarily supplied by the residual 20 per cent.

The Mexican authorities divide cannabis production into two major zones: the Pacific region, responsible for 52 per cent of production, and the Central-North area, responsible for 47 per cent. In recent years, the share cultivated in the Pacific has declined, and that in the Central-North area has increased. The Mexican government says they have eradicated almost all of the crops located in the top 10 producer provinces since 1994, but that residual areas remain in the Sierra Madre mountains.[4] Cultivation micro-regions occur in a long arc through the Sierra Madre Occidental to the Sierra Madre del Sur, roughly coincident with the opium producing areas. The Government of Mexico estimates that 70 per cent of its cannabis is destined for the United States and 30 per cent for local markets.[5]

This would suggest that about 3,000 tons of cannabis are reserved for domestic use. Current estimates of cannabis consumption among the adult population, based on a 2002 survey, indicate that only 1.6 per cent of the population uses cannabis annually. This allows nearly 2 kilograms of cannabis per user per year, or 5 grams per user per day, equivalent to about 10 American-sized joints, which appears to be much too high. Either the production figures are exaggerated, the estimate on the share of production remaining in the country excessive, or the number of users is greater than the survey data would indicate. Given the volume of drugs in the country, the latter explanation is the most likely.

The United States ranks second in seizures of herbal cannabis, seizing some 1,118 metric tons in 2004, an estimated 18 per cent of the world's total. While cultivation has been discovered in every one of the country's 50 states, most of the large-scale cannabis production seems to be concentrated in just a few areas. Eradication reached a new high in 2005 to over 4 million plants seized, with counts highest in California, Kentucky, Tennessee, Hawaii, and Washington.[6] This is a different profile from previous decades, where the Midwest played a more prominent role.

In recent years, much of the outdoor production in the United States has been found in so called 'guerrilla

grows' on public lands, such as the national forests and parks of California and Kentucky. As enforcement strengthens in California, outdoor cultivation has moved to public lands in Oregon and Washington.[7] Rangers eradicating crops on public lands in California are frequently met with violent resistance from the organized crime groups controlling the trade, and booby traps on guerrilla grows are not uncommon.

US authorities claim that domestic cannabis production is increasingly controlled by Mexican organized crime groups. While polls conducted in the United States suggest that much of cannabis cultivation and distribution takes place via social networks, a more than US$10 billion market attracts organized crime elements. A recent assessment of gang activity in the United States found that 65 per cent of law enforcement agencies polled said that gangs were involved in the distribution of cannabis in their areas, a much higher share than for any other drug.[8]

The lack of consensus on the amount of cannabis produced in the United States highlights the fact that even countries with sophisticated monitoring systems struggle to come up with credible estimates of the extent of domestic cannabis cultivation. One government estimate placed production at between 3,100 and 7,100 metric tons in 2004,[9] but other figures have placed it as high as 19,000 tons.[10] The high end of these estimates is very difficult to reconcile with what is known about global production. The International Narcotics Control Board, in its annual report for 2005, suggests that 10,000 tons of cannabis are produced each year in the United States, a significant share of the global total.[11]

Some 11 per cent of the US population over the age of 12 uses cannabis annually, including 28 per cent of people aged 18-25[12] and over a third of children in their final year of high school.[13] The United States Office of National Drug Control Policy has estimated that these users consumed, on average, a remarkable 19 joints a month containing 0.4 grams of cannabis in 2000, for a total consumption of over 1,000 metric tons of cannabis. While the amount of cannabis consumed per user seems remarkably high, given that a large share of these are casual users, the total consumed is rather low, about a third of the lowest estimates of domestic production alone, let alone imports.

In the past, both Jamaica and Colombia were major suppliers of cannabis to the United States, but it would appear that both have been displaced by the rise of Mexican organized crime to its current position of dominance, and the growth of Canadian production. Jamaica is still a major supplier to the rest of the Caribbean, along with St Vincent and the Grenadines.

In Canada, an estimated 960 to 2,400 metric tons of cannabis are produced annually.[14] Canada has also stepped up enforcement, seizing 1.1 million plants per year between 1998 and 2002, a six-fold increase over 1993.[15] Cannabis of Canadian origin is trafficked mostly to the United States but reportedly also to Asia, including Taiwan Province of China and Japan.

Formerly, most of Canadian production had been concentrated in British Columbia, but this is no longer the case. Seizure and eradication figures suggest that Ontario and Quebec have recently caught up, and, more recently, major operations have been detected in other provinces.[16] At present, about 40 per cent of Canada's cannabis is produced in British Colombia, with 25 per cent coming from Ontario, 25 per cent from Quebec, and 10 per cent from other provinces.[17]

In Canada, most of the medium and large cannabis production operations are controlled by organized crime. Outlaw Motorcycle Gangs, such as the Hell's Angels, control outdoor and hydroponic (plants grown indoors in a nutrient bath, rather than soil) grows, while Vietnamese groups control indoor organic (soil-based) production.[18] Previously, cross-border trafficking was conducted by small-scale traffickers, and the growth of organized crime involvement is reflected in the growing size of shipments across the border.[19] Money derived from cannabis operations may be allowing minor organized crime groups to graduate to weapons and explosives trafficking, cocaine smuggling, and stock-market fraud.

The Americas as whole are estimated to have a cannabis production of around 24,000 metric tons.

Africa: Massive seizures, uncertain origins

With an estimated production of 11,000 metric tons, Africa is the second largest producer of herbal cannabis in the world. After North America, Africa leads the world in herbal cannabis seizures and is growing in importance: in 1990, only 16 per cent of world cannabis seizures were made in Africa, but by 2004, it was more than 30 per cent. In 2004, 818 metric tons of herbal cannabis were seized in South Africa alone, ranking third in the world, after Mexico and the United States.

Production takes place in all sub-regions in Africa, with major seizures being made in North Africa (Morocco and Egypt), West Africa (Nigeria and Ghana), East

Africa (Tanzania and Kenya), and Southern Africa (South Africa, Swaziland, Lesotho, Malawi, and Zambia). Much of this product is consumed on the continent, as an estimated 8 per cent of African adults consume the drug each year, but there are also substantial exports to Europe, and, to a lesser extent, to Asia.

Morocco is the world's largest producer of cannabis resin, and possesses the largest documented cannabis cultivation area. Morocco produces about 80 per cent of the resin consumed in Europe,[20] and Western Europe was responsible for about 74 per cent of global seizures in 2004.

The Government of Morocco, in cooperation with UNODC, has conducted comprehensive cannabis resin surveys of the country for the last three years. The 2003 survey placed total resin production at about 3,070 tons, cultivated on 134,000 hectares of land in the Rif region by some 96,600 families, providing income for about 800,000 people. The 2004 survey showed a 10 per cent decline in the land dedicated to cannabis cultivation (120,500 ha), with production falling to 2,760 tons. Drought, combined with eradication efforts, resulted in a strong decline in production in 2005.

In 2004, the total gross farmers income from cannabis cultivation is estimated at about US$325 million. Based on an estimate of some 804,000 persons benefiting from cannabis cultivation in the Rif region, this represents a gross per capita income of US$400, well below the country's overall 2003 GDP per capita of US$ 1,478. Clearly, cannabis production in Morocco is the recourse of poor farmers, who do not make a great deal off the trade.

Aside from Morocco, credible estimates of the number of hectares under cannabis cultivation are difficult to find in Africa. In South Africa, the best developed country in sub-Saharan Africa, estimates vary, but are generally between 1,000 and 2,000 hectares, located mostly along the east coast of the country. Most plots are small, averaging about 300 square metres.[21] South Africa is a significant source of cannabis exports to Europe. For example, in 2004, the Republic of Ireland reported that 99 per cent of the cannabis consumed in their country comes from South Africa.

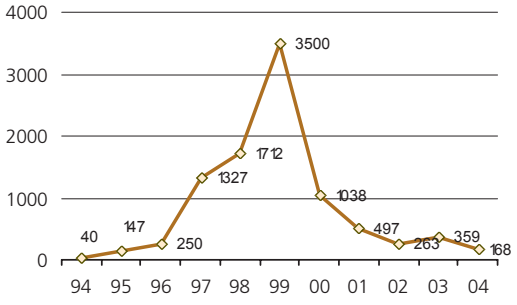
It is estimated that 70 per cent of the cannabis entering South Africa was grown in Lesotho, and cannabis is estimated to be Lesotho's third largest source of income. Fields are rarely larger than one hectare, and the plant is grown alongside corn. As in South Africa, small farmers sell their produce to wholesalers, who consolidate the many small inputs for trafficking, and multiple harvests are claimed. All but the main harvest are rather unimpressive, however, with plants remaining rather small.

Swaziland is known for producing high-quality cannabis. The seed stock has been marketed internationally. In 2001, the Swazi police noted cannabis trafficking to the United Kingdom, the United States, the Netherlands, and Japan,[22] and this situation does not appear to have changed much more recently. The Swazi authorities eradicated between 400 and 500 hectares annually between 2001 and 2003.

Malawi is also world renowned for the quality of its cannabis. About three to nine tons are seized annually in this small, under-policed country of about 13 million people, suggesting a substantial export market.

Cannabis is also grown for export in West Africa, notably in Nigeria, Ghana, and Senegal. Cannabis is presently cultivated in all 36 states of Nigeria,[23]though the plant was only introduced to the area following World War Two[24] "Operation Burn the Weeds" was launched in 1994, and has become the title of Nigeria's ongoing eradication program.[25] After a peak in the late 1990s, relatively little area was eradicated in the first years of the 21st Century, contrary to some international reports. Preliminary figures from the 2005 eradication effort suggest that renewed attention is being given to the matter. Cannabis of Nigerian origin is known to be trafficked to other West African countries. Nigeria reported the second largest cannabis herb seizures in Africa (after South Africa) in 2004.

Fig. 3: Hectares of cannabis eradicated in Nigeria



Source: National Drug Law Enforcement Agency, Nigeria.

Ghana has one of the highest known rates of annual cannabis use, with an estimated annual prevalence of 22 per cent in 1998. Ghana's cannabis production has expanded greatly since the 1960s,[26] and it has been named as the source of a number of recent major seizures (in excess of one metric ton) of herbal cannabis destined for Belgium and the United Kingdom. The Belgian authorities estimate that 25 per cent of the cannabis trafficked into their country comes from Ghana, and Ghana is listed as a major supplier to Italy, after Albania.

In Senegal, the distribution of cannabis is mostly regional, with Dakar, other urban centres in Senegal, and Gambia being significant outlets.[27] Cannabis trafficking has reportedly been a source of funding for the insurgents of the Movement of the Democratic Forces of Casamance (MFDC), though its relative importance has been debated among experts.[28] It has been claimed that the Liberian National Patriotic Front for Liberia traded guns for MFDC cannabis.[29]

There is also documented production of cannabis resin in Senegal, although the extent to which this product is trafficked internationally remains unclear. In 2003, the German police seized 2.7 tons of cannabis resin in a motor home in Hamburg, which they say originated in Senegal and transited Mauritania and Morocco. Its ultimate destination was said to be the Netherlands.[30] The country has also been the source of a number of significant seizures of resin of unknown origin destined for Belgium, typically concealed in vehicles such as campers and trucks. Resin has been seized coming into Senegal from both Morocco and Afghanistan, so it is unclear how much of this is locally produced.

In East Africa, fairly large-scale cannabis cultivation occurs in Kenya, primarily in the Lake Victoria basin, in the central highlands around Mt. Kenya and along the coast. As much as 1,500 hectares of cultivation have been estimated in this area, some in the lower farmlands concealed among traditional crops and smaller cultivation in the higher reaches in areas regarded as national wildlife reserve.[31] Despite two successful, highly publicized targeted raids of 14 farms along Mt. Kenya in 2001 and 2002 that collectively destroyed 461 tons of cannabis, police saw an increase in this crop during targeted raids in 2004.

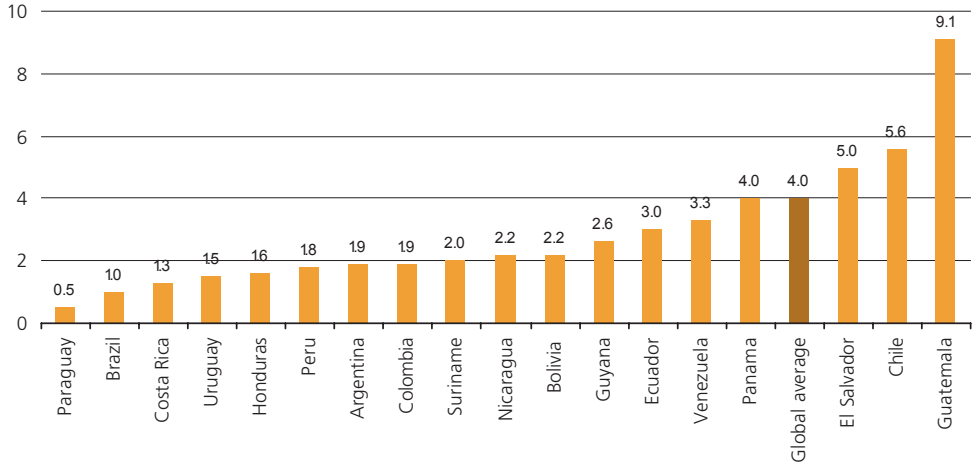
Cannabis is cultivated in ten of the 20 regions of mainland Tanzania, especially in those near the international borders, and police believe that as many as half of the families in these ten regions of the country are involved in the cultivation of cannabis.[32] Seizures have been impressive, though erratic, with an unbelievable haul of 733,222 kilograms in 2003. From January through June 2004 the Tanzanian government destroyed over 230,000 kilograms of cannabis, nearly as much as the annual total in the previous record year, in 2001.[33] According to official reports, 80 per cent of the cannabis in Tanzania is grown domestically, with 20 per cent being imported from Malawi, and 90 per cent of locally produced cannabis is consumed locally.[34] This is remarkable because estimates on the prevalence of cannabis use in Tanzania, based on 1999 survey data, are very low (0.2 per cent). It is likely that the user population has grown in the last seven years, since over 5,000 people were arrested for cannabis-related matters in 2003 and over 2,000 people were arrested for dealing cannabis in the first half of 2004 alone.[35] Still, the extent of transhipment is probably being underestimated, although the destination of this traffic is unknown.

South and Central America: Too much production, too few users?

South America contains two major exporting countries, one that exports beyond the region (Colombia) and one that exports primarily for regional consumption (Paraguay). South America is unusual in having high levels of seizures and, according to surveys, low levels of domestic use. Only one South American country has reported an annual adult cannabis use level above the global average: Chile (5.3 per cent in 2004). [36] Chile is one of the most developed countries with the lowest crime levels in the region, and has one of the lowest levels of seizures. But Brazil (with 1 per cent of the population 12-64 reporting cannabis use in 2001), Colombia (1.9 per cent estimated), Paraguay (0.5 per cent estimated), Argentina (1.9 per cent estimated), and Bolivia (2.2 per cent estimated) all made it to the top 20 nations in terms of the weight of cannabis seized in 2004. If the survey figures are correct, either interdiction rates are extremely high, or much of the cannabis cultivated in the region is exported. With the exception of Colombia, however, none of the nations is known to export cannabis in any great quantity outside the region.

High regional levels of production with low levels of use pose something of a puzzle. For example, only 1 per cent of the population age 12 to 65 in Brazil reported using cannabis in 2001, a total of just over 1 million annual users. But looking just at the amounts seized, nearly 200 metric tons of herbal cannabis were found in the country in 2002, for an average of about 200 grams

Fig. 4: Share of the adult (15-64) population using cannabis annually in South and Central America



Source: UNODC DELTA Database Estimations

seized per user for the year. In addition, almost 2.5 million plants were eradicated that year. If these had been missed, they could have produced another 250 tons, raising the per user production to almost half a kilo apiece. This is more than a joint a day apiece, which is probably more than was actually consumed by these annual users, many of whom use only occasionally. And this is just the amount destroyed, likely a fraction of the total present in the country. Unless interdiction rates are above 50 per cent, these figures suggest an export market, but Brazil is not known to be a major exporter of cannabis. In fact, it is a major importer; officials argue that most of the cannabis consumed in the country comes from Paraguay, with only 20 per cent being produced locally.[37]

Most Brazilian cannabis is grown in the Northeast of the country, although estimates of the land under cultivation vary widely, from 3,500 hectares to 118,000 hectares. Production is said to involve plantation style operations, utilizing forced labour, with connections to urban organized crime.[38] Cannabis grown in Brazil supposedly has a 90-day production cycle, allowing three to four annual harvests in the irrigated areas of the Northeast and three harvests in the rain-fed areas of the North. Farmers are estimated to make as much as US$ 150 per month (average) by growing cannabis. The price of 1 kg of cannabis at the producer level is less than US$ 30. This can be sold for approximately US$ 220 on the streets.[39]

In a school survey of seven Latin American countries, Paraguay had the second lowest levels of annual cannabis use (1.7 per cent), and cannabis was only the second most popular drug, after *jarra loca* (a mix of wine and tranquilizers)[40] and its estimated adult use levels are the lowest in Latin America. Yet only Brazil and Colombia claim higher seizures that Paraguay, with about 80 tons seized per year, or about 1.3 kilograms for each of about 60 thousand annual users. Aside from being the primary supplier of Brazil, law enforcement officials in Argentina, Chile and Uruguay all claim that nearly all their cannabis comes from Paraguay. So a lot of the cannabis grown in Paraguay goes out of the country, but it is still surprising that a country with so much production per capita would have so little local consumption.

Paraguay contains an estimated cultivation area about the same as that in Colombia – around 5,500 hectares. In 2004, the Paraguayan government eradicated 753 hectares of this area.[41] In 2005, authorities estimated total land area under cultivation to be 6,000 hectares, producing 15,000 tons of cannabis in two harvests of 3,000 hectares each.[42] If these estimates are accurate, Paraguay is producing about a third more cannabis than Mexico, and is likely the world's largest producer of herbal cannabis, responsible for a good share of global production. The destination of this massive supply is a mystery, as estimates indicate very small user populations, and Paraguay is not known to export beyond the continent. According to Paraguayan law enforcement

authorities, 85 per cent is destined for the Brazilian market, 10 per cent-15 per cent for other Southern Cone countries, and 2 per cent-3 per cent for local consumption.[43] Paraguayan authorities estimate the yield of cannabis crops at an incredible three metric tons per hectare,[44] attributable in part to the development of a strain of cannabis that can be grown in the dry months of the winter.[45] Paraguay also produces a form of cannabis resin – *cera Paraguaya* – for export to Argentina and Brazil.

Colombia has long been the region's primary exporter of cannabis. In the 1970s, when Colombian exports to the United States were at their peak, some 30,000 hectares were estimated to be under cannabis. More recently, the United States has estimated that 5,000 hectares have been under cannabis cultivation every year since 1996, with a potential yield of about 4,000 metric tons, of which less than 6 per cent has ever been seized in Colombia.[46] In 2003, Colombia reported eradicating 20 hectares, and estimated that 2,000 remained for production. Colombia also eradicated some 11,000 cannabis plants in three major cases in 2003.

Chile, the country with the highest per capita use levels in the region, destroyed nearly 80,000 plants in 2003 (about 8 tons of potential cannabis), showing sizeable domestic production, mostly in the centre of the country. The Chilean government estimates local production capacity at about 80 tons, suggesting a 10 per cent eradication rate. Despite this, it estimates that 78 per cent of its supply comes from Paraguay, some 20 per cent of the cannabis consumed locally is of unknown origin, and about 2 per cent is from Peru. Some four tons were seized in 2003, and since Chile is not an obvious trafficking route to anywhere, they were probably intended to be consumed in the country.

While cannabis is cultivated and used in most Central American countries, exports are small and interdiction capacity is limited. In 1995 and 2000, the Inter-American Observatory on Drugs described Central American seizures as 'insignificant.'[47] But Costa Rica, a country with just over four million citizens, claims to have eradicated about two million plants in 1999, 2000, and 2001, and about one million in 2002 and 2003, enough for 100 to 200 tons of production.[48]

Oceania: The world's highest use levels?

Cannabis grows wild on many of the region's countries and territories, including Australia, Fiji, Federated States of Micronesia, New Zealand, Papua New Guinea, and Samoa, as well as in American Samoa.[49] Most countries are self-sufficient in terms of their cannabis supply, and there is little evidence of widespread cross-island trafficking in Oceania today.

In Australia, an estimated 5,000 hectares of cannabis are cultivated in the outdoors,[50] often on public lands, but the most commonly detected method of cultivation is actually indoors.[51] Almost all cannabis used in the country is locally produced. Cannabis trafficking to Australia has declined greatly in recent years, due in part to law enforcement efforts and in part to growing domestic production, particularly indoor production. In 1996/7, over 24 tons of cannabis were seized at Australia's borders[52]. In contrast, in 2003/4 total seizures of cannabis entering the country amounted to only 15.3 kg, with an average weight of less than 25 grams per detection.[53]

Most of the cannabis produced in New Zealand is used domestically. Crops are regularly eradicated, destroying about a half a million plants annually.[54] Most plots are situated in the more remote areas of the North Island. There appears to be a relationship between cannabis cultivation operations and the manufacture of methamphetamine – the New Zealand authorities report locating seven clandestine methamphetamine laboratories during the course of a two-month spraying operation.[55]

In Papua New Guinea, cannabis and annual use levels are believed to be among the highest in the world (30 per cent of those aged 15-64 in 1995, the latest survey available). The country produces Nuigini Gold, a distinct cultivar characterised by its red stem. Nuigini Gold was formerly exported to Australia, but is no longer widely available in that country. In 2002, it was reported that firearms were being traded for the drug, fuelling high level of violence among local communities, but these accounts have more recently been discredited.[56] In 1998/1999, Papua-New Guinea was the embarkation point for 30 kg of cannabis intercepted by Australian Customs, but by 2003/4, this figure was less than one kilogram.[57] Cannabis is produced in remote areas of the Highlands where it has to be transported by foot, and much of this cultivation appears to be small scale. Seizure figures have not been provided to UNODC, but reports from other sources also suggest the amounts trafficked are also relatively small.[58] In the cities, the drug is dealt by 'raskols', urban street gangsters.

In Indonesia, over 200,000 cannabis 'trees' were uprooted by the government in 2004, and 24 tons of

the drug were seized in 2003. Seizures more than tripled in 2004, with almost 85 metric tons. The Indonesian authorities claim that half the local production is consumed domestically, while the other half is exported to Australia, although this conflicts with the Australian claim that most of their cannabis is produced domestically. It has been alleged that the Free Aceh Movement (GAM), an insurgent group, was funding itself in part through cannabis trafficking. The Indonesian police report recently seizing over 40 tons of cannabis and arresting a number of GAM members guarding the production areas. As in other areas where insurgencies are allegedly involved in cannabis, the GAM allegedly levies a tax on rural production, which is controlled by Jakarta-based trafficking organizations.[59]

Cannabis cultivation in the Philippines appears to have grown dramatically in the last three decades, from just nine identified plantations to 107 in 2005.[60] In the Philippines in 2004, using manual eradication, the government destroyed 2.4 million cannabis plants and seedlings.[61] The Communist New People's Army is said to provide protection to growers in the northern areas exchange for a 'revolutionary tax'. The Abu Sayyaf Group (ASG) also collects protection money and controls a thriving cannabis production site in Basilan. Most of the cannabis produced in the Philippines is for local use, with the remainder supposedly smuggled to Australia, Japan, Malaysia, Taiwan Province of China, and Europe.[62]

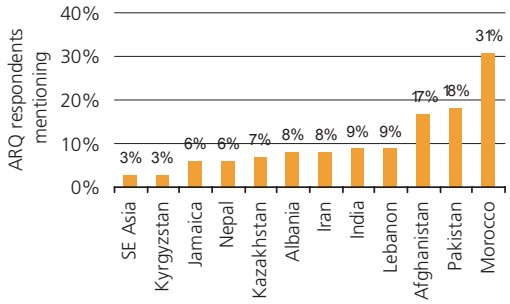
Europe: A changing market

Cannabis use has increased substantially in almost every country in Europe over the last 10 years, and Europe currently accounts for about 20 per cent of global cannabis use. While Europe cannabis use is often associated with cannabis resin, it does possess a substantial and growing herbal market. Indeed, in Austria, Belgium, Czech Republic, Estonia, and Netherlands, the market for herbal cannabis is estimated to exceed that of cannabis resin.[63] If estimates about the growing market share commanded by home grown product in the United Kingdom are accurate, then its herbal market may also be larger. And while it is believed that cannabis resin is still most popular in Germany, the margin is small and may be growing smaller. In countries where herbal cannabis represents a cheaper source of THC than resin, resin may be facing a declining market share.

Over half the cannabis resin seized in the world in 2004 was seized in Spain (794 tons out of 1,470 tons seized) and 100 per cent of the cannabis resin seized in Spain is believed to originate in Morocco. Adding in the rest of West and Central Europe accounts for 74 per cent of the global total, and another 86 tons were seized at source in Morocco. Thus, the Western Europe/Morocco resin market is responsible for about 80 per cent of global resin seizures.

Morocco is said to be the source of all the resin consumed in Spain and Portugal, and most of that consumed in France (82 per cent), Belgium (80 per cent), Sweden (85 per cent), and the Czech Republic (70 per cent). Much of the cannabis resin transits Spain and the Netherlands before being shipped to other countries. The remainder of the resin supply originates in Afghanistan/Pakistan, Central Asia or from within Europe (mainly Albania).

Fig. 5: Countries and regions identified as source of cannabis resin



Source: Annual Reports Questionnaire data.

In Germany, the bulk of seized cannabis products entering the country in 2003 came from two sources (both about 3.5 tons, out of 8.6 tons imported): relatively small shipments (of an average weight of about 2 kg) from the Netherlands and massive shipments (averaging about 1 ton) directly from Morocco. Spain was also a significant supplier (just under a ton) of medium sized shipments (averaging 15 kg). In 2004, the size of the Moroccan shipments dropped drastically (to an average of 64 kg), and the Netherlands became clearly the leading source, responsible for half of the volume and 78 per cent of the cases.[64]

The Netherlands has long been an epicentre of cannabis cultivation in Europe and beyond. Many countries or areas indicate that the Netherlands is a significant source of the herbal cannabis entering their counties, either as an origin or a transit country, including Austria, Belarus, Belgium (25 per cent of all cannabis in the

country is estimated to be Dutch), Czech Republic (50 per cent), Estonia (20 per cent), France, Germany, Hong Kong Special Administrative Region of China, Hungary (50 per cent), Iceland, Ireland, Italy (17 per cent), Latvia (50 per cent), Lithuania (75 per cent) Luxembourg, Poland, Spain, Sweden, Switzerland, and the United States. In addition, several other countries identify the Netherlands as a transit zone for resin entering their countries. The role of the Netherlands in the global production of high-potency cannabis is discussed below.

Belgian authorities report 90 per cent of the cannabis produced in their country is for export, and that cultivation areas are found mostly along the border with the Netherlands. Despite this, small-scale production for personal use appears to be on the increase. Some 70 per cent of the cultivation operations detected in 2003 involved less than six plants.[65] Belgian and Dutch groups are said to "control" indoor production in France.

In Eastern Europe, Albania remains a major exporter of herbal cannabis, where mass production began in the southern parts of the country in the early 1990s.[66] Herbal cannabis is said to be trafficked by road from Albania through the former Yugoslav Republic of Macedonia and Bulgaria to Turkey.[67] Albanian cannabis also feeds the markets of Austria, Bosnia and Herzegovina, Bulgaria (45 per cent), Croatia (30 per cent), Greece, Italy (77.4 per cent), Serbia and Montenegro (50 per cent), Slovenia, the Former Yugoslav Republic of Macedonia and Sweden.[68] Cannabis production in the southern areas of Albania is believed to be destined almost exclusively for export to Italy.[69]

In addition to receiving imports from Albania, cannabis is also cultivated domestically in Greece and Italy. Some 200,000 cannabis plants were eradicated by the Italian authorities in 2003. Greek authorities uprooted 21,000 plants in 2003, about 40 per cent of which were found on Crete. The growth in Albanian cannabis production is believed to be linked in part to the Greek crackdown on cannabis cultivation in some areas of the country.[70]

In Bulgaria, cannabis is grown in the Southwest and in the North/ Northwest. Many of the growers are elderly, paid by people linked to organized crime. Production on public lands is also reported.[71] About half the herbal cannabis trafficked in Bulgaria is domestic, while most of the balance is Albanian, and this produce may be trafficked on to Turkey and Greece. Some 12 tons of cannabis plants were destroyed in eradication operations in 2003 in a relatively small number of operations (31), suggesting large-scale cultivation.

About 20 per cent of herbal cannabis trafficked in Croatia is domestic, with the balance being imported from Bosnia (about half), Serbia, Montenegro, and other areas. About half of this remains in the country, while the rest is trafficked to Western Europe. All domestically produced cannabis is consumed in the country, however.

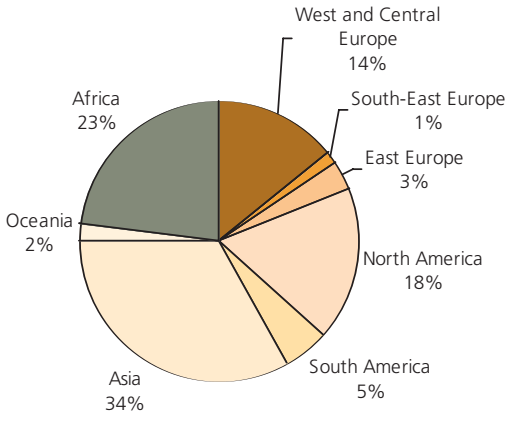
Polish authorities report cultivation of cannabis in Central, Southeastern, and Western Poland, in cereal fields, by forest roads, in gardens, and in greenhouses. In 2003, they eradicated over six hectares of cultivated area, and seized 32 indoor operations. They estimate about 45 per cent of local produce is destined for export, mainly to the Netherlands and Germany.

As discussed further below, the United Kingdom seems to be undergoing a transition from reliance on imported herbal cannabis and resin to locally produced herbal cannabis. Despite this, large amounts of cannabis are still imported into the UK. A recent example is the seizure of five tons of cannabis from Mexico hidden in a containerised shipment in October 2005.[72]

Asia: Home to a third of global cannabis users

Asia as a whole has the lowest per capita rate of cannabis use of any major region in the world (2.2 per cent) but sheer population size means that it is home to the largest

Fig. 6: Regional shares of global cannabis users



Sources: UNODC, Annual Reports Questionnaire Data, Govt. reports, reports of regional bodies, UNODC estimates.

number of users, some 34 per cent of the estimated global total.

Central Asia, in particular the countries of Kazakhstan and Kyrgyzstan, contain what appears to be the largest cannabis fields in the world. In Kazakhstan's Chui valley alone, as much as 400,000 hectares of cannabis grow wild, with a potential output of 6,000 tons, but an estimated harvest of only 500 tons.[73] This wild cannabis has an unusually high THC content, up to 4 per cent,[74] making it viable for low-end international sale, and good stock for cannabis resin production. The consensus is, however, that most of this cannabis is consumed in the region, and that its value does not merit long-range trafficking across multiple borders.[75] Thus, while the productive potential of this area remains immense, it is likely to remain unrealised unless circumstances change.

The Kyrgyz authorities have estimated cultivation at about 6,000 hectares since 2001. In the Kyrgyzstan districts surveyed by UNODC, approximately 3,005 hectares of cannabis were identified. More than 70 per cent of the cannabis found was either on abandoned farmland or on land being used for agricultural purposes.[76]

Russian authorities say 70 per cent of the herbal cannabis consumed in their country is locally produced, with another 15 per cent coming from Kazakhstan and Ukraine, and 15 per cent from Kyrgyzstan and Moldova.[77] In some areas, such as South-East Asia and the Caucasus region, the demand for cannabis products is still almost entirely satisfied by local production.[78] Authorities estimate 63 per cent of domestic cannabis cultivation occurs in the oblast of Kursk, with 13 per cent occurring in the Moscow region.[79]

The second largest market for cannabis resin is the Near and Middle East/Southwest Asia region. This region is mainly supplied from cannabis resin produced in Afghanistan and Pakistan and, to a lesser degree, from cannabis resin originating in Lebanon. Some of the cannabis resin from Afghanistan/Pakistan is also being shipped to Canada and to countries in Eastern Africa.

Afghanistan has long been a centre of cannabis resin production, both for regional use and for being trafficked to Europe. While today Afghanistan commands only a minority share of Europe's resin market, production remains considerable. Cannabis is grown like a hedge around opium poppy plots, with the same farmers cultivating both drugs.

The Afghan authorities report the area under cannabis cultivation in 2003 to be 52,000 hectares, compared to 80,000 hectares of opium poppy in that year. Each hectare is said to produce 85 kg of resin a year. Estimated total resin production was thus 4420 tons according to the Afghan authorities. In contrast, research by UNODC in connection with the annual opium survey suggested a cultivation area of about 30,000 hectares. Cannabis production was reported to take place in most provinces of Afghanistan.

In 2003, there were more people arrested for cannabis trafficking (62) than for heroin trafficking (41) in Afghanistan. Cannabis seizures were exclusively in the form of cannabis resin (81.2 tons). Cannabis resin trafficking was reported to have increased, mainly going to central Pakistan as well as to the Islamic Republic of Iran, Tajikistan and Turkmenistan. The Afghan government reports that 5 per cent of the cannabis is locally used, and the rest is for export.

Most of cannabis processing is reported to take place in the border regions with Pakistan.[80] It is thus difficult to disentangle Afghan and Pakistani cannabis products, and while it is widely believed that cannabis is produced throughout Pakistan, it would appear that the bulk of the cultivation occurs on the Afghan side of the border.

Turkey reports about half of the resin trafficked into the country comes from Lebanon, with 27 per cent coming from Syria, and 18 per cent coming from Iran. Lesser amounts are also said to come from Jordan. But, in 2003, the Syrian and Jordanian authorities said that all the cannabis resin in their countries came from Lebanon.

Lebanon was once the world's leading producer of cannabis resin. In the late 1980s, cannabis cultivation was estimated to be as high as 11,000 to 16,000 hectares, yielding up to 1,000 tons of cannabis resin. From 1991 to 1993, Lebanese and Syrian forces eradicated illicit cultivation in the Bekaa Valley. Despite this, 40 tons were still seized in 1994.[81] In 2002, it was again estimated that over 11,000 hectares were under cultivation, dropping to 727 hectares in 2003. In 2004, a reported 16,000 hectares were eradicated. The Lebanese authorities assert that 98.8 per cent of the cannabis resin produced in the country is also used there, with a small share being exported to Bulgaria and Dubai, United Arab Emirates. Most production today occurs in the Bekaa Valley, in the areas of Baalbek and Hermel.

The Syrian authorities say 100 per cent of the cannabis resin trafficked in their country comes from Lebanon,

and 95 per cent of it is headed for the Gulf States, with 5 per cent being destined for Turkey. They assert there is no drug production in Syria.

In South Asia, cannabis is also cultivated in India, especially in the Kullu Valley in Himachal Pradesh. In addition, cannabis is grown in Andhra Pradesh, Uttar Pradesh, Tamil Nadu, Kerala, and Manipur states, as well as in remote areas of Jammu and Kashmir. In 2004, the Indian government eradicated 214 hectares of cannabis. Seizures of 144 metric tons were reported in 2004. In addition to local production, cannabis resin ('charas') is imported from Afghanistan, Pakistan, and Nepal. It is smuggled into India from Nepal across the land border in the states of Bihar and Uttar Pradesh, from where it finds its way to Delhi and Mumbai.[82]

India is a major cannabis consumer country. In 2004, UNODC and the Indian Ministry of Social Justice and Empowerment, jointly released the National Survey on the Extent, Pattern and Trends of Drug Abuse in India, the first of its kind. It showed that 2.3 million Indians were dependent on cannabis.[83]

In Nepal, cannabis is cultivated in the southern parts of the country and grows wild through much of the north. Nepalese cannabis resin is trafficked around the world, with seizures made in the United Kingdom, Denmark, New Zealand, Hong Kong Special Administrative Region of China, and Canada. There have been claims that Maoist revolutionary groups are using cannabis to fund their insurgency. Maoists are known to have called upon locals in the Birgunj area to increase cannabis production. The Nepalese authorities report that the Maoists levy a 40 per cent tax on cannabis production in certain areas.[84] There is evidence that the Maoist insurgents both charge a levy on cannabis resin passing through territory they control and operate a system whereby growers are authorized to cultivate a certain hectarage per year for the payment of a fee.[85]

In Southeast Asia, herbal cannabis also continues to be cultivated in and smuggled out of Cambodia, Indonesia, Lao People's Democratic Republic, Myanmar and Thailand. Some 14 hectares of cannabis were eradicated in Cambodia in 2004, and production is said to be as much as 1,000 tons. Much of the production occurs in Cambodia's northwest provinces and is reputed to be "contract cultivation" with Cambodians operating with the financial help, and under the control or influence of foreign (especially Thai) criminal syndicates.

A similar phenomenon is seen in Lao People's Democratic Republic (PDR), where low-grade cannabis production is largely in the lowlands, in the southern Lao PDR and in particular in areas near to the Mekong River. Most of this is for export to Thailand, undertaken on contract for Thai organized crime groups, who advance money and consolidate production in Thailand, Cambodia, and Lao PDR.[86]

Some of this produce is transhipped through Viet Nam, confusing its source of origin, while cultivation in Viet Nam is said to be 'insignificant'.[87] Viet Nam, however, had a long tradition of cannabis cultivation and was once the source of potent cannabis for export to the US market.

The 2005 drug abuse surveillance data has shown that cannabis use has been increasing across China, with high levels of use in Xinjiang, Hubei and Guangdong provinces.[88] Eradication campaigns have been carried out in the Yunnan province and the autonomous Uighur region. In Hong Kong Special Administrative Region of China, herbal cannabis is imported from the Golden Triangle, Cambodia, and the Netherlands, often via South Africa, Dubai, or Thailand, whereas resin is imported from South Asia.

As the discussion above indicates, the state of our knowledge on the extent of global cannabis production is far from perfect. In many regions, it is difficult to reconcile production estimates with what is known about local consumption and trafficking. For example, in both Latin America and Africa, large seizures are made in countries with low reported use levels that are not known to export cannabis. It is unclear where this drug is coming from and where it is going. Even in the United States, a country with a regular household survey on drug use, a large eradication programme, and well-developed criminal intelligence, recent official estimates of the extent of domestic cultivation vary by more than a factor of six. These difficulties are necessarily reflected in any attempt to estimate of the scope of global production.

A global market that defies efforts to size it up

The above makes clear that cannabis is widespread, but determining how much is produced is another matter entirely. There are two broad approaches that could be taken. One is to start with information on extent of production (supply-side), such as estimates of the extent of cultivation and crop yields, or seizure figures. The second is to estimate how much is consumed (demand-side), though user survey data and research on how much of the drug is typically consumed to produce the desired effect. The problem is that these two approaches

typically produce very different results, as highlighted in the discussion that follows.

How much is produced?

The Annual Reports Questionnaire (ARQ) sent every year by UNODC requires Member States to provide estimates of the number of hectares under cultivation in their respective countries, but most do not fill out this section. In fairness, most states would have little knowledge of how to make such an estimate. This leaves one with little information on which to base a supply-side calculation of total global production.

Combining the information available about the biggest markets with seizure data may help to come up with some idea of the number of hectares under cannabis cultivation, at least for those markets for which reliable estimates exist. The table below lays out the top producers about which information is available. Together, these nations are responsible for at least 78 per cent of global cannabis seizures.[89]

This approach suggests that the bulk of global cannabis production could occur in an area of about 231,000 hectares, of which more than half are in Morocco. This is a small area, about the size of the Comoros. Of this, about 10 per cent gets eradicated. The estimated seizure rate for these big producers is about 17 per cent, including seizures made by destination countries. In other words, after eradication, four-fifths of the remaining cannabis gets past law enforcement.

This rate of interdiction refers to some of the most developed markets in the world, and it is likely that the corresponding figure in places like Africa is much less. Application of this rate should therefore be considered a low-end estimate. Global cannabis seizures in 2004 were 6,264 tons of herbal and 1,470 tons of resin (about 37,000 tons of herbal equivalent) for some 43,000 tons of global cannabis production seized. If this is about a fifth of true production, about 215,000 tons were produced in 2004. However, most of this (85 per cent) was reduced to resin. Total cannabis product output should thus be over 30,000 tons of cannabis herb and more than 7,000 tons of resin.

How much is consumed?

Another way of estimating global production is to look at global consumption. To come up with demand-side estimates of total cannabis production, three things need to be known:

1. What share of the global population consumes cannabis annually?
2. How many days a year do they consume it?
3. How much do they consume on the days when they use the drug?

Table 1: 2003 Cannabis production estimates for major producers

	Estimated hectares under cultivation	Hectares eradicated	Estimated production in herbal equivalents[90] (tons)	Total seizures in herbal equivalents (tons)[a]
Morocco	134,000	---	98,000	21,000[b]
Afghanistan	52,000	---	50,000	6432[c]
Mexico	29,500	22,000	10,400	2160
United States	-4500	365[d]	4455	1224
Paraguay	5,500	753	15,000	257[e]
Colombia	5,000	0	4,000	134
TOTAL	231,000	23,118	181,885	31,207

Figures in parenthesis are estimates based on other data; resin data are converted into "herbal equivalent" by multiplying by 25

a Assumes a 4 per cent yield.
b Assumes Morocco is responsible for 80 per cent of resin seizures in Spain, France, UK, Portugal, Italy, Germany, Belgium, Ireland, Denmark, Norway, and Sweden.
c Assumes Afghanistan is responsible for 100 per cent of resin seizures in Pakistan (as per ARQ) and Iran - the Afghan contribution to European resin is not included.
d Total plants converted to 1 plant per square metre outdoor equivalents.
e Assumes Paraguay is responsible for 80 per cent of herbal seizures in Brazil and Argentina.

One key issue in trying to determine the amount of cannabis required to meet global demand (in metric tons) is that not all cannabis is created equal. Cannabis resin and sinsemilla (the potent flowering tops of the unfertilised female plant – see Annex 1) are concentrated forms of the drug, and users use less of these drugs (in terms of weight) than they would of low-grade product. In order to relate demand to production, the markets for these products would ideally be calculated separately.

What share of the global population consumes cannabis annually? Answering this question requires some extrapolation, as there are massive gaps in the survey data. The traditional approach is to use sub-regional averages to calculate use levels for those countries for which data are lacking. It is also possible to extend data from a limited sub-sample of the population (the most obvious example being school surveys) to the population as a whole on the basis of ratios determined from countries where both sets of data exist.

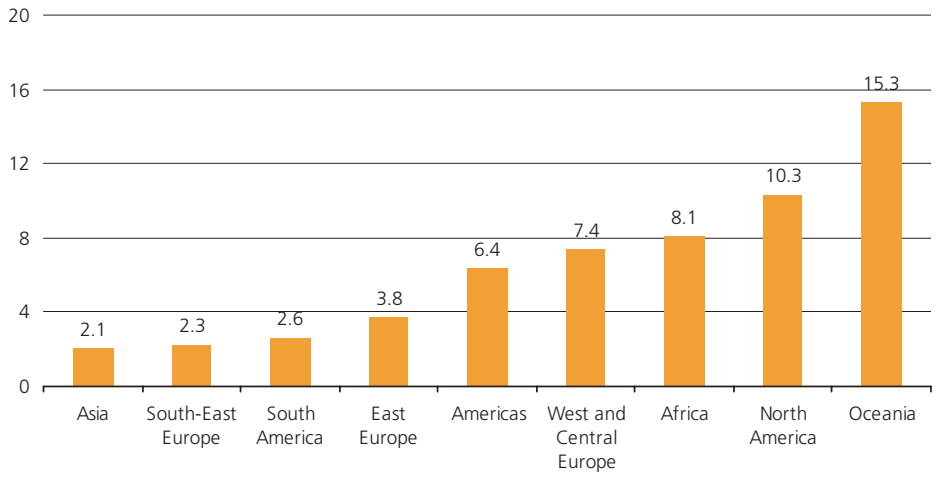
All this is hinged on the survey data. There has been considerable debate about the veracity of self-reporting on matters involving criminal activity,[91] and the level of inaccuracy may vary considerably– in areas where drug use is highly stigmatized, subjects may be unwilling to report use, even if confidentiality is assured.

An additional complication lies in the fact that surveys on cannabis use generally do not distinguish between herbal and resin use. From the prospective of reconciling use data with figures on cultivation, this is a major problem, since production of cannabis resin requires a much greater land area. However, since resin potency and herbal potency are approaching parity in Europe, the largest market for resin, it is probably fair to assume the rate at which users consume resin is about the same as the rate at which they consume herbal cannabis, and this is all that matters for a demand side estimate.

The UNODC estimate of global annual adult prevalence for cannabis use is 4 per cent, or about 162 million people. Use rates vary substantially by region, but for the rough estimate made here, regional differences in consumption patterns are not taken into account.

Of course, these 162 million people did not all use cannabis at the same rate. Some of them may have experimented with the drug once or twice, while others consume the drug on a daily basis. It is estimated that 10 per cent of people who try cannabis will progress to daily use for some period of their lives, with a further 20 per cent to 30 per cent using on a weekly basis.[92] This leaves, however, a large share of people whose use is less frequent. The prevalence of use tends to vary depending on the life-stage of the user. For example, about 60 per cent of French 19-year-old boys have tried cannabis, and, of these, more than one in three uses 20 times a month or more. This share drops greatly in later life stages.[93]

Fig. 7: Regional annual prevalence rates



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, reports of regional bodies, UNODC estimates.

Sources from a wide range of countries suggest that about 14 per cent of annual cannabis users are daily users, a higher figure than many would expect. If these figures could be generalized to the total global population, this suggests that about 22.5 million people use cannabis daily or near-daily, with the other 138.5 million using it less often. This figure is important because only at the level of daily or near-daily use does tolerance develop, and this has an impact on the amount of cannabis used. Of daily users, about a third are chronically intoxicated. For more details on this breakdown, see Annex 3.

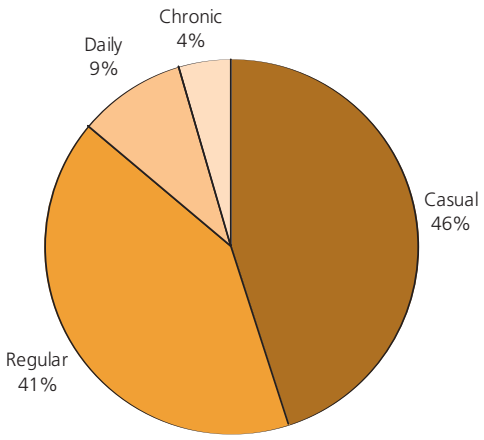
One can estimate that of the 162 million people who use cannabis each year, about 75 million could be classed 'casual' (using less than once a month), 66 million could be classed 'regular' (more than monthly but less than daily), 15 million 'daily', and 7 million 'chronic' (continually intoxicated) users. These groups can be expected to consume at different rates.

Casual users are unlikely to finish a joint by themselves in any of the one to 11 sessions of use in the year (for more on cannabis dosage, see Annex 3). More likely, these users had two to three hits off a 0.5 gram joint shared by three or four people, representing about 0.15 grams of cannabis consumption per usage session. The distribution curve for less than 12 time per year users is heavily skewed towards one to three sessions of use according to the US data, and a weighted average of this category is about four sessions per year. Thus 75 million people would smoke an average of 0.15 grams of cannabis an average of four times a year, for a total of 45 tons of total consumption.

While regular users, who do not consume cannabis on a near-daily basis, are not likely to build up much of a tolerance, they are more likely to consume the drug alone, or more than once in a single day of use. On the other hand, they are also more likely to prefer premium cannabis (which may be up to 10 times stronger) and to have better inhalation technique (which can increase THC absorption four fold), both of which would mean that they would require less cannabis to get high than casual users. If it is assumed that these factors cancel each other out somewhat, the average use level of about 0.15 grams per day of use can be maintained. The distribution of responses in the US is also skewed toward the lower end in this group, with a weighted average of about 100 days of use. These 66 million people would thus smoke an average of 0.15 grams an average of 100 times a year, for a total of 990 metric tons of consumption.

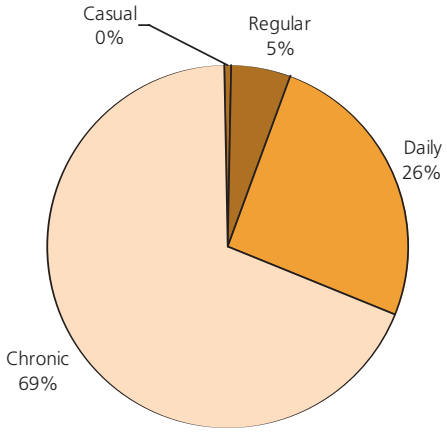
Daily users, according to most sources, consume between one and four joints a day. The weighted average in this category, based on the American data, is about 320 days of use. Thus, 15 million people smoked an average of one gram of cannabis a day for 320 days a year, for a total of 4,800 metric tons of consumption in 2004.

Fig. 8: Breakdown of annual cannabis users by frequency of use



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, reports of regional bodies, UNODC estimates.

Fig. 9: Shares of total cannabis consumption by frequency of use



Sources: UNODC, Annual Reports Questionnaire Data, Government reports, reports of regional bodies, UNODC estimates.

Chronic users can consume huge amounts of the drug. Use patterns vary so widely that it is impossible to come up with an average, but using medical cannabis guidelines and field reports, it appears that about ten joints, or five grams, of cannabis is a reasonable level for fairly constant intoxication. These seven million users consume every day, so their total consumption should be about 12,775 metric tons.

This estimate supports the oft-made assumption that a core of 'heavy' users consume the bulk of the cannabis produced. The 22 million people (13.5 per cent of all users) who use the drug every day consume 95 per cent of the drug and of those, 7 million (4 per cent) who smoke it constantly consume 69 per cent.

Can supply and demand-side estimates be reconciled?

Supply and demand side estimates have proven difficult to reconcile for a range of analysts. The 2006 *World Drug Report* estimates global cannabis production at about 45,000 tons, and the global consumer base at 162 million people annually. Dividing the one quantity by the other results in about 277 grams per user, or over a quarter of a kilo apiece. If we use a figure of 0.5 g of cannabis per joint (see Annex 1), 277 grams therefore equals 554 joints per year, or more than one and a half per day per user. Taking the example of the US market, with a price of $10 a gram, each user would spend $2,770 on cannabis in one year. With a US national average per capita income of about $35,750, this expenditure would represent 8 per cent of pre-tax income of every American who smoked cannabis last year. Although the bulk of this is consumed by a highly dedicated cadre of daily and chronic users, many of whom must have access to a free supply of cannabis, this still seems impossibly high.

Two possibilities may be considered:

- The amount of production is being overestimated, or
- The number of users is being underestimated.

Just over 6,000 tons of cannabis were seized in 2004, which would mean that about 15 per cent of total estimated global production is seized. A seizure rate of more than 15 per cent seems unlikely, given that the ratio of estimated Mexican production to seizures is just over 20 per cent (2,000 of 10,000 tons), and it is unlikely that less well resourced regions (such as much of Africa) would perform better. This is particularly true given recent trends towards smaller-scale indoor production within developed countries and production for personal use. Thus, it is unlikely that production is being significantly overestimated.

The estimated number of annual users – at nearly 4 per cent of the global population 15-64 – is already very high. Even doubling this rate would only halve the average consumption per annual user to 110 g, which is still over $1,000 a year per user in the US. Doubling US annual use estimates would also mean more than a quarter (26 per cent) of all Americans 15-64 spent this amount of money on an illegal drug last year.

The problem may lie with the seizure figures, rather than the production figures. Since it is unlikely that all seizures are weighed, and it is likely that eradicated crops are added into the total in some cases, an element of estimation exists in generating seizure figures. In theory, the entire cannabis plant could be used for psychoactive purposes – in practice, increasing demand for quality in today's market means that user-ready sales are often of the flowering tops only. Thus, seizure estimates may be dealing with a lot of bulk that would never translate into saleable street product. If seizure amounts were scaled down, production figures could also be adjusted without exaggerating the interception rate.

Turning to the figures generated for this chapter, demand side estimates place global production at 19,000 tons per year. But this is 19,000 tons of cleaned product, not 19,000 tons of the product as it is generally sold. On the supply side, an estimated 231,000 hectares are under cultivation, but the majority of these are dedicated to cannabis resin. An estimated 30,000 tons of cannabis herb and just under 7,000 tons of resin are produced, of which 6,264 tons of herbal and 1,470 tons of resin were seized in 2004, leaving about 24,000 tons of herbal and 5,500 tons of resin for consumers. The difference of 5,000 tons between the two estimates on cannabis herb (24,000 tons for the production side estimate and 19,000 tons for the demand side estimate) may be attributable to the distinction between cannabis as sold and cannabis as used.

Unfortunately, given the paucity of the data, the arguments above cannot move beyond the hypothetical. Too little is known about how and where cannabis is being grown. Each year a growing number of people consume the drug, but the source of their supply and the extent of their use remain obscure. This state of ignorance is particularly unsatisfactory given emerging information about the dangers of cannabis use. Cannabis is changing in alarming ways, and, at present, the international community lacks the capacity to apply more than rough estimates to the scope of the problem.

2.3. The emergence of 'new cannabis' and the reassessment of health risks

The health consequences of cannabis are a matter of longstanding debate. A range of official national commissions have reviewed the topic, and exonerated cannabis of many of the charges laid against it.[94] But in just the last decade, sinsemilla cannabis has doubled in potency in a number of key markets, and a range of recent studies have highlighted the negative impact the drug has on mental health in particular.

The re-engineering of cannabis

Improved breeding and the rediscovery of sinsemilla

Cannabis consumption in the Western world really took off in the second half of the 20th century, and since those early days, consumer tastes have evolved considerably. Most of the cannabis smoked in the 1960s would be considered to be of low quality today. In addition to seeds, it comprised a great deal of the large leaf, twigs, and other material that would be currently regarded as waste. Improvement in the 'manicure' (the portions of the plant offered for sale) may be seen as an inevitable consequence of the maturation of the market.

But law enforcement action in the second half of the 1970s to the early 1980s appears to have inadvertently prompted other improvements in the product. First, it reduced the availability and the quality of imported cannabis in many of the most important consumer markets, particularly the United States. Second, it seems to have pushed some domestic production indoors,[95] and stimulated growers to focus on producing greater quality rather than quantity in order to evade detection. These developments prompted a revolution in production technology in the United States, which was later spread to Europe and beyond.

Until the mid 1970s, nearly all the cannabis consumed in North America was a landrace[96] strain of the so-called sativa variety (see Annex 1 for more on the varieties of cannabis). The subjective effects of sativas are preferred by those who are looking for a more cerebral effect, possibly due to high levels of THC relative to CBD levels (see Annex 1). But sativas are both late maturing (making them difficult to grow in northerly latitudes) and very tall (making them difficult to conceal outside and problematic to grow inside). It was not until seed stock from central Asia and the Middle East was introduced to the gene pool that these problems were overcome. These 'indica' genes accelerated the life cycle, boosted yields, and produced plants that were both more cold resistant and more manageably sized.

Experiments crossing sativa and indica strains led to the development of "skunk", a hybrid said to be 75 per cent sativa and 25 per cent indica, which was among the first to capture the THC high of the sativas with the rapid growth cycle and yield of the indicas.[97] It remains one of the cornerstone cultivars used in contemporary breeding, and in countries such as Australia, France, New Zealand and the United Kingdom, cannabis with a high THC content is often referred to as 'skunk' today.[98]

At the same time, an ancient cultivation technique was being reinvigorated. The term '*sinsemilla*' refers to the product of a growing technique, not a genetic strain or special preparation of the plant. The most potent cannabis is comprised exclusively of the female flowering heads ('buds') that have remained unfertilised throughout maturity and which, consequently, contain no seeds (i.e. are *sin semilla,* 'without seeds' in Spanish). The production of sinsemilla requires identifying the females and ensuring that they are not exposed to male pollen, and then marketing only the buds and small leaves. Cannabis cultivators in India have long known that the best cannabis comes from the unfertilised buds of the female plant, and have employed 'paddars' (ganja doctors) to remove male plants from cultivation areas before they are mature enough to cause any damage.[99] The technique was also apparently understood in Central America, though it appears to have fallen into disuse. It is very difficult to grow unfertilised plants outdoors in areas of intense cultivation, because a single rogue male can ruin an entire crop. Thus, the law-enforcement prompted move towards more indoor cultivation may have supported the expansion of the production of seedless cannabis.

Most commentators place the emergence of sinsemilla in the United States around the early to mid-1970s,[100] and in Europe to about 1980.[101] Today, nearly all high-grade cannabis is grown sinsemilla. Indeed, while Western cannabis markets may exhibit many shadings, most contain a stark distinction between seedless product grown of good genetic stock (usually produced domestically or in another developed country) and more mundane product, field-grown domestically or in a developing country.

The potency of sinsemilla is much higher than the seeded product, with a 2004 average of about 10.5 per cent THC in the US (as compared to 2.5 per cent for low-grade cannabis)[102] and close to 18 per cent in the Netherlands[103] (as compared to about 6 per cent for imported cannabis).[104] Individual samples have exhibited THC levels in excess of 30 per cent, although this is extremely rare. Sinsemilla is distinct enough in appearance and potency to be considered a separate drug. There has even been discussion of scheduling sinsemilla as a 'hard drug' in countries that that have liberalised their cannabis policies.[105]

The application of greenhouse technology

In addition to improved breeding and the rediscovery of sinsemilla, the movement towards indoor cultivation has also allowed the application of greenhouse technology to what had traditionally been a field crop.[106] Around 1985, some cannabis breeders from the United States fled for a country with more amenable drug policies – the Netherlands. At the time, indoor cultivation of cannabis was just starting to take off in the Netherlands,[107] and the fusion of American breeding stock and Dutch agricultural practice sparked a revolution in cannabis breeding and production.[108] Today, Dutch 'seed banks' sell the product of this breeding over the Internet, in competition with a growing number of rivals, notably those based in Canada.

The first and most obvious boost to sinsemilla production was the use of clones. 'Cloning' simply means taking a cutting from a successful 'mother' plant, a technique known to anyone who grows houseplants but not generally used in field agriculture. This cutting is rooted and planted. It is a genetic duplicate of its mother and can be used to generate still more cuttings. Eventually, a grower can work with entire crops of genetically identical plants. A square meter of mother plants can produce 100 clones a week.[109]

There are several advantages of working with clones. First, the cuttings are guaranteed to be exclusively females. Growing from seed means that half the crop will be waste (male) plants, and overlooking a male can ruin an entire sinsemilla crop. Second, the clones will be duplicates of a mother proven to be a successful producer, and whose lifecycle and weaknesses are known. Finally, the clone assumes the life-stage of the mother, and so needs less time to reach flowering than would a similarly sized plant grown from seed. Used in combination with the forced flowering technique, clones dramatically accelerate the rate of cannabis production.

In addition to selective breeding for fast maturity, the rate at which cannabis plants come to flower can be increased by manipulation of the light cycle. Outdoors, the success of cannabis grown for drug purposes is highly dependent on latitude. This is because most types of cannabis only flower when the days grow shorter. At high latitudes, this happens before the plant has had a chance to fully develop, or is coincident with lethal frosts. This makes outdoor cultivation in much of Europe, for example, very difficult, especially for sativa strains that evolved at lower latitudes. Indoors, these restrictions clearly do not apply, and, in addition, the photoperiod (the amount of light received by the plants during the day) can be manipulated to force flowering whenever it suits the grower.

Forced flowering results in smaller yields per plant than if each plant had been allowed to mature further, but this is more than offset by the faster overall production time and in the greater number of small plants that can be fit into a given growth area. Whereas traditional outdoor growers are limited to one or two harvests a year, indoor growers can stagger production to produce almost continual harvests. The turnaround time from clone to harvest is generally on the order of eight to ten weeks, allowing between four to six harvests off the same square meter of floor space. The best-known example of this is the Dutch "Sea of Green" (SOG) technique, of which there are many variations.

The SOG technique involves cultivating a large amount of plants in a given area for a short period of time before flowering. This results in a smaller yield per plant, but more plants in a harvest, with shorter cultivation periods, which allows for more harvests per year. Different parts of the growing area are used for plants in different stages of their life cycle, staggering production. The total process, from seeds to sales, can take about 16 to 18 weeks, but this can be shortened by the use of clones. From clone to harvest can take as little as two months, allowing up to six harvests a year from the same floor space.

The 'new cannabis' has doubled in potency in the last decade.

From the above, it becomes clear that a large number of people in several countries have worked very hard over the course of decades to produce more potent cannabis. But it is still being debated whether their work has had any impact on the potency of the global cannabis supply. As early as 1980, claims were made that cannabis potency had increased by a factor of 10 (from 0.2 to 2

per cent) over five years.[110] There have been subsequent claims that cannabis potency has increased by a factor of 30 or even 60 since the 1970s. These claims have been criticised as exaggerated as they rely on the very low THC levels found in some early tests, which may been inaccurate due to storage issues and other methodological difficulties.

Claims of extreme increases in potency and the reaction they have garnered have cast doubt on the general argument that cannabis today is different from cannabis in the past. This is unfortunate, because there can be little doubt that cannabis has changed, and that high potency cannabis represents an important and growing sector of the market in a number of major consumer countries.

The potency debate has generally hinged on measurements from police forensic testing. This information is collected for other purposes, not to create international comparable, time-series data. There is really no systematic programme monitoring cannabis potency levels anywhere in the world. Probably the closest is the United States Marijuana Potency Monitoring Project (MPMP), but this programme does not involve a random sampling of the cannabis available in the country.[111] From this core problem are derived several others, relating to terminology, sampling and more technical aspects of testing.

There are also complications related to the nature of cannabis itself. THC degrades over time, so the age of the sample and the conditions under which it was stored are highly relevant. The moisture content also varies greatly, and for this reason, samples seized on the street cannot be compared to samples taken during field eradication, unless the moisture levels are standardised.

Traditionally, potency has been framed in terms of either delta-9 THC content or total THC content,[112] without regard to other psychoactive cannabinoids. THC, however, is only one of a number of psychoactive chemicals in cannabis, and one, cannabidiol (CBD) in particular is believed to 'moderate' the effects of THC, promoting relaxation and possibly even having an antipsychotic effect. Accordingly, the growth of sinsemilla, which typically shows low levels of CBD, could be changing the nature of the cannabis experience. Where possible, it would be advisable to track both THC and CBD levels in future evaluations of 'potency'.

Since different laboratories do THC testing for different purposes, comparing findings is difficult. Differing techniques are evident in the fact that some Western European countries that source most of their cannabis resin from the same area (in Morocco), such as Portugal and Italy, report dramatically different THC levels. Even within a given jurisdiction, techniques have improved over time. This makes comparing figures between countries or over time difficult.

Combining the forensic data with other information sources, however, gives good reason to believe that high-end cannabis is more potent than in the past and that this product is commanding a growing share of the market in many important consumer markets.

First, there can be little doubt that knowledge about the cultivation and use of cannabis as a drug has improved since the 1960s. The 'medical marihuana' providers in Canada are able to mass-produce 14 per cent THC herbal cannabis. While individual samples of similar or greater potency may have been found in the past, it is highly unlikely that anyone operating thirty years ago would have been able to approximate this performance. The sinsemilla technique, selective breeding for potency, more selective manicuring, a greater understanding of ripeness, curing, and storage techniques, and other improvements in cultivation technology have made it possible to produce far more potent product than was possible in the past.

But just because the technology is there does not mean that all cultivators use it. The vast bulk of cannabis grown throughout the world is still cultivated the traditional way. In many countries, growers lack the knowledge, the resources, and the incentive to produce better quality cannabis. The market for low potency product remains strong, and producing higher quality requires both more work and more input costs. Even if a cannabis farmer in a developing country wanted to improve potency, he would have to find a market for this product. Local consumers may not be able to afford his produce, and his international connections would be linked to established low-potency markets.

Thus, a higher potential potency does not necessarily mean an increase in the average potency consumed by users. In order to understand the real impact of the new cannabis technology in specific markets, the relative market shares of the high-end and low-end markets need to be observed across time.

The 2004 European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) study on cannabis potency in Europe is the best recent cross-national study of forensic information.[113] The study cites estimates on the market share of four product types in Europe: imported herbal cannabis, cannabis resin, sinsemilla,

and domestic resin. Most cannabis consumers prefer one product or the other, so the herbal and resin markets should be seen as distinct, not agglomerated. Within the herbal market, data distinguishing between sinsemilla and imported cannabis were available for only three countries: the Netherlands, the United Kingdom, and Ireland.

- In the Netherlands, 67 per cent of the cannabis consumed is sinsemilla, 29 per cent imported resin, 3 per cent imported herbal, and 1 per cent domestic resin.

- In the UK, in contrast, sinsemilla holds only 15 per cent of the total market, but it holds 50 per cent of the herbal market. In other words, imported herbal also holds 15 per cent of the market, and imported resin 70 per cent. Other analysts suggest that as much as half the cannabis consumed in the UK might be produced domestically, most of which would be sinsemilla.[114]

- In Ireland, herbal cannabis is also evenly split between local sinsemilla and imports, with most of the market (90 per cent) being imported resin.

Thus, for the three European countries for which sinsemilla information was available, the sinsemilla market either equalled or exceeded the herbal import market.

The share of detected cannabis cultivation operations that are located indoors in the US has also increased in recent years, from 2 per cent indoor in 1985 to 7 per cent indoor in 2003, with the greatest change being seen between 1989 and 1992.[115] Law enforcement sources confirm that indoor cultivation is as widespread as outdoor cultivation, and that the sinsemilla market is growing.[116]

In addition, Canada is playing an increasingly important role in cannabis imports to the US, contributing 20 per cent of the cannabis imported into the US in 2003.[117] Between 1997 and 2000, some 78 per cent of cannabis production operations detected in British Columbia, the province that produces over 40 per cent of the detected cultivation operations in the country and a major supplier to the US, were indoors. The number of detected indoor operations tripled during the same time period.[118] A slightly lower share of all operations detected in the country were indoors.[119] Canadian authorities consider all the cannabis they test to be sinsemilla, and average potency levels were 9.6 per cent in 2003, compared to 7.4 per cent for US sinsemilla.[120]

The trend has been towards larger and larger indoor operations, due in part to the growing involvement of organized crime groups in production.[121] US sources estimate that Canada produces about 12 per cent of the cannabis consumed in the US (about 1,000 metric tons per annum).[122] This would suggest Canadian sinsemilla imports alone should comprise at least 8 per cent of the American market.

Other countries have also shown a growing market for indoor, sinsemilla, high potency cannabis. In New Zealand, for example, the number of national survey respondents who had ever used 'skunk' increased from 10 per cent in 1998 to 14 per cent in 2001.[123] In the United Kingdom, survey research concludes that 'skunk' was the only type of herbal cannabis to improve its market share among regular users between 1994 and 1997, up just under 10 per cent during this time period.[124] In Australia, after many years of winning market share from both imports and a remarkable outdoor industry,[125] hydroponic (plants produced indoors in a nutrient bath rather than soil) production is now the most commonly detected method of cultivating cannabis.[126] In 2003, Hong Kong authorities noted for the first time the importation of 'buds' from the Netherlands.[127]

Internationally, there appears to be a trend toward developed countries relying more on internal production and less on imports. In the United States, for example, the estimated share of cannabis that is grown domestically has increased dramatically in recent years. In 1986, it was estimated that one-sixth of cannabis consumed in the United States was produced within the country,[128] whereas more recent estimates place this at one third,[129] and the most recent assessment suggests that this trend is continuing.[130] Similarly, in Canada in 1985, only 10 per cent of the cannabis consumed was produced domestically,[131] but by 2002, it was estimated that "well over half" was Canadian grown.[132] In the United Kingdom, as noted above, an estimated 30 per cent of the cannabis used by regular users was home grown in 1997,[133] increasing to 66 per cent in 2005, and imports from Morocco, Netherlands, and India appear to have decreased.[134] In the Netherlands, the trend has been away from imported cannabis resin and towards domestically produced sinsemilla and cannabis resin. Even in Iceland, "Domestically cultivated marijuana has become increasingly competitive with imported marijuana, and current estimates indicate it makes up anywhere from 10 per cent to 50 per cent of the total cannabis market."[135]

Part of this move toward domestic product is due to an increase in small-scale production for personal consumption. Belgian authorities report that production for personal consumption is on the increase in their country, and that some 70 per cent of the cultivation operations detected (258 in 2003) involved less than six plants.[136] While survey respondents may be willing to admit use of cannabis, they may be hesitant to admit cultivation, since this is generally regarded as a more serious (and ongoing) offence. Nonetheless, in New Zealand, a household survey found that 10 per cent of all current users grew at least some of their own supply.[137] The corresponding survey in Australia found just over 5 per cent grew their own supply.[138]

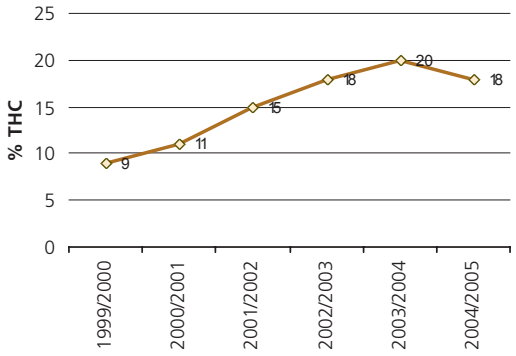
The share of people cultivating for personal use is much higher among those who use the drug frequently. A survey of regular users in Australia found that two-thirds of respondents grew some cannabis for their own use, and nearly half grew all or most of the cannabis they used.[139] This tendency is not limited to areas with good conditions for growing cannabis, like Australia. In the United Kingdom, 63 per cent of a sample of regular users reported having grown the drug at some point in their lives, growing an average of 24 plants. They estimate that while only 30 per cent of the cannabis used by regular users in the United Kingdom was homegrown in 1997,[140]66 per cent was home grown in 2005.[141] If this is correct, a significant share of the cannabis used is produced and distributed free within the country. A study concurs, "…domestic production is on the increase and as much as half of the cannabis consumed in England and Wales may be grown here. Some cultivation is on a commercial basis, but much is on a small scale, for personal use or use by friends."[142]

Research suggests that what these small growers do not use or give away, they often sell within their social circle. According to US national survey data, most (78 per cent) of those who say they bought the drug in the last year say they bought it from 'a friend'. In Australia, the figure is also over 70 per cent, with only 14 per cent buying from a dealer.[143] Even higher figures were found in an international comparative study of cannabis users in Bremen (80 per cent) and San Francisco (95 per cent).[144] Only 1 per cent of annual users polled bought from a stranger in Ireland.[145] While social networks may also deal in imported product, the job of transporting drugs across borders is more likely to be dominated by professionals. In contrast, those producing indoors on a small scale would very likely market their product through friends.

Thus, it would appear that the supply of high potency cannabis is growing in developed countries as production becomes increasingly domestic and indoor, although demand remains for low potency products as well.

Within this growing share of the market, potent products appear to have been made much more potent in the last decade. The EMCDDA study and subsequent literature show quite dramatic increases in the sinsemilla potency in the United Kingdom (up from about 6 per cent in 1995 to over 12 per cent in 2002) and the Netherlands (up from about 9 per cent in 1999/2000 to about 16 per cent in 2001/2002).[146] More recent figures from the Netherlands drawn from about 60 annual samples of the most popular strains of nederwiet (sinsemilla) purchased from coffee shops show a doubling in potency between 1999 and 2003, with levels stabilizing at about 18 per cent since that time (Figure).

Fig. 10: Sinsemilla THC levels in the Netherlands

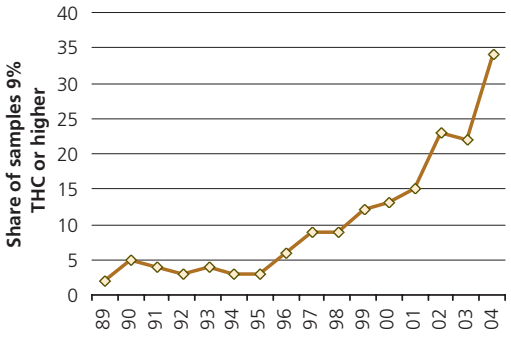


Sources: Niesink, RJM, Rigter, S, & Hoek, J., THC-concentraties in wiet, nederwiet en hasj in Nederlandse coffeeshops (2004-2005). Utrecht: Trimbos Institute, 2005.

In Germany, the European country with the largest sample base, no distinction is made between sinsemilla and low-grade cannabis. Despite this, aggregate herbal potency has been clearly going up very recently. In 1996, samples averaged about 5 per cent; in 2004, they were about 11 per cent.[147] This is very significant, as the EMCDDA estimates herbal cannabis commands 40 per cent of the growing cannabis market in Germany.

In the United States, virtually all cannabis seized by the agencies of the national government is tested by the Marijuana Potency Monitoring Project (MPMP) at the University of Mississippi, which has been in place for

Fig. 11: Share of MPMP samples testing above 9 per cent THC

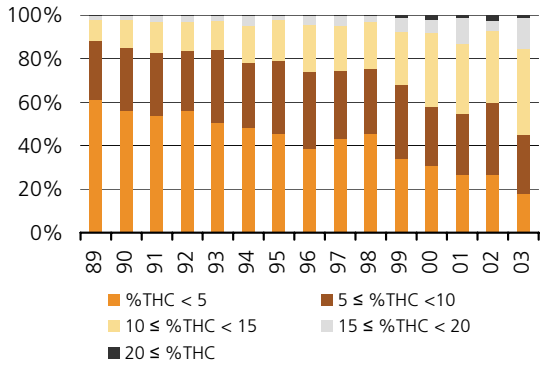


Source: Marijuana Potency Monitoring Project (MPMP)

over 20 years. The trend generally reported is an aggregated one, including both sinsemilla and low potency products, but it has been unmistakably upward for some time. This trend strongly suggests an increased availability of high potency product since the mid-1990s. As in the Netherlands, the increase has been particularly pronounced since 1999.

In Canada, before the early 1980s, THC levels seldom reached above 1 per cent, but by the late 1990s they were over 6 per cent.[148] Declining shares of tested samples have less than 5 per cent THC and a growing share

Fig. 12: Canadian cannabis sample THC breakdown



Source: Adapted from Viau, R., L. Marro, M. Walker, Retrospective Examination of the THC Levels of Marihuana Seized in Canada, Second Technical Conference on Drug Control Research Vienna, July 19-21, 2004.

register above 10 per cent. Very high potency samples (above 20 per cent) remain relatively rare, but have certainly increased in share since 1999. These changes are partly attributed to changes in the make-up of samples admitted for analysis.

Thus, for every country where reliable data are available, it appears that sinsemilla is commanding a greater share of the herbal cannabis market, and that this sinsemilla has become dramatically more potent in the last decade. In summary, it would appear that the technological capacity to produce large amounts of high-potency cannabis has emerged in recent decades. This has serious implications for the developed countries where such product is consumed.

Impact on public health: Three reasons to worry

The growth of acute health episodes

The existence of higher THC products and the growth of the high potency market do not necessarily mean that more THC is being ingested. In theory, users could simply consume less. The onset of psychoactive effect for smoked cannabis is very rapid, so users should receive quick feedback on their levels of intoxication.

However, the existence of a more concentrated form of any drug does pose a risk, especially for novice users. A single 'hit' or two of extremely potent product may even catch experienced users off guard, since tolerance develops only with near daily use, and those accustomed to a particular consumption pattern may not adapt it sufficiently to take into account highly variable product strength. Cannabis is often consumed in groups, and social pressure may be a key factor in the amount consumed.

Measuring these effects is extremely difficult, but there are several indicators that the emergence of high-potency sinsemilla has resulted in more THC consumption. First, it would be expected that higher potency would result in smaller units of consumption, but evidence from several countries show that, if anything, the size of consumption units has increased. Second, there have been unexplained increases in the number of emergency room episodes associated with cannabis in the United States, and in the share of total treatment berths occupied by people seeking help with cannabis in both the US and in Europe.

One of the best data sets for evaluating the extent to which cannabis use contributes to acute medical prob-

lems comes from the United States. The Department of Health and Human Services' Substance Abuse and Mental Health Services Administration (SAMHSA) is responsible for collecting a range of important indicators about the state of substance abuse in the United States. These include the Drug Abuse Warning Network (DAWN), which records the number of cases in which medical staff from a representative sample of emergency room departments determined that presenting trauma was related to the use of legal or illegal drugs (referred to as 'mentions'), as well as deaths that coroners determine to be drug-related.[149] While there are very few deaths attributable to cannabis use, the number of cannabis-related emergency room episodes is substantial, and has risen over the years.

According to the medical professionals participating in the DAWN system[150], 'marijuana' (which includes cannabis resin) was a feature in 45,259 emergency room episodes in 1995. The number of mentions increased to 119,472 in 2003, a 164 per cent increase. Looking at these figures as rates, which would take into account the increase in population during this period, there were 47 mentions per 100,000 in 2002, an increase of 139 per cent over 1995. This increase is less than was seen for MDMA (767 per cent) but more than for cocaine (33 per cent) or heroin (22 per cent).

These figures would support the argument that cannabis emergency room admissions for cannabis have increased, and have increased at a rate disproportionate to most other drugs of abuse. But other SAMHSA data indicates that overall cannabis use levels also increased during this period. According to the National Survey on Drug Use and Health (NSDUH), the number of annual users of cannabis in the United States was 17,755,000 in 1995. This figure increased to 25,755,000 in 2002, an increase of 31 per cent.

Using these figures, it is possible to calculate the number of drug users per emergency room cannabis mention. In 1995, there was one visit for every 392 people who used the drug that year. In 2002, there was one visit for every 216 users, an increase of 55 per cent. This suggests that the share of total cannabis users who find themselves in an emergency room has increased.

However, when cannabis was mentioned, it was usually mentioned in combination with other drugs. In 72 per cent of the cases when cannabis was mentioned, other drugs were also mentioned. Thus, in only a minority of cases could it be clearly argued that cannabis was the only drug that might be involved in precipitating the emergency room visit. But the share of "cannabis only" mentions has increased since 1995, when 78 per cent of the episodes where cannabis was mentioned also featured other drugs, which supports the notion that the drug on its own is becoming more problematic.

Those seeking emergency attention with a drug situation are further classified as to the exact cause of the emergency. In recent years, the most common reason for seeking emergency room attention for cannabis is an unexpected reaction to the drug. This is consistent with the kind of effect that would be expected with the increasing circulation of high potency cannabis.

The growth of rehabilitation demand

In addition to acute episodes, high potency cannabis could contribute to chronic problems in a variety of ways. It has been argued that increased potency represents increased addiction potential.[151]

Once again, the best data on treatment presentations comes from the largest cannabis market, the United States, in the form of the Treatment Episode Data Set (TEDS), which tracks some 1.5 million admissions to drug treatment in facilities that report to state administrative data systems.[152] Unfortunately, using these figures to determine the extent to which drug users are finding their consumption to be problematic is complicated by the fact that large shares of people entering treatment do not do so voluntarily. Those apprehended in possession of cannabis (especially young people) are often given a choice in court: enter treatment via a diversion programme or go to jail.

According to TEDS, 111,418 people were admitted to treatment in 1993 with cannabis as their primary substance of abuse, comprising 7 per cent of the overall treatment population. In 1999, this number was 232,105, comprising 13 per cent of the treatment population. In other words, the number of cannabis admissions more than doubled in six years and, in addition, cannabis users nearly doubled their share of the treatment population. However, this increase took place at a time of renewed law enforcement focus on cannabis use: the number of cannabis arrests increased from 380,700 in 1993 to 704,800 in 1999, an increase of 85 per cent. During this same period of time, non-cannabis drug arrests increased by just 11 per cent.[153] Partly as a result, the share of cannabis users in treatment who were there due to a criminal justice referral increased during this period. It appears that changes in criminal justice policy were responsible for the bulk of the dramatic

increase between 1993 and 1999, but they do not account for all of it. With regard to the treatment data, therefore, the American case is inconclusive.

However, the United States is not alone in seeing an increase in the number and share of cannabis admissions to treatment. A similar trend is seen in Europe, where most countries have been liberalizing their cannabis policies, rather than emphasizing enforcement, in recent years. Treatment data within Europe are not uniform, so it is difficult to compare between countries. But it would appear that cannabis has increased its share of the treatment population in all European countries for which records are available in recent years. The increase is lowest in Greece and Italy, two countries that receive most of their herbal cannabis from Albania. Some of the countries where the market share of sinsemilla has increased, such as Germany and the Netherlands, have also seen dramatic increases in the treatment share for cannabis. Exceptions include the United Kingdom (believed to be using more sinsemilla but with modest increases in treatment share) on the one hand and Sweden (still largely consuming cannabis resin but tripling admission share) on the other.

These figures refer to the share cannabis holds of the treatment population, and thus documents that cannabis is becoming more problematic relative to other drugs. In most cases, this would also suggest an increase in absolute numbers of cannabis users seeking treatment.

Monitoring efforts in Australia are too new for time series data, but cannabis commanded 43 per cent of the non-alcohol treatment admissions (some 27,000 individuals), ahead of heroin and amphetamines, in 2002-2003.[155] Criminal justice referrals made up at least 37 per cent of this treatment population, however.[156] Independent of this data, it has been argued that an increasing number of people are seeking treatment for cannabis problems in centres used to treating alcohol and opiate dependence.[157] The reasons for this increase remain unclear.

In South Africa, cannabis has also grown in its share of admissions to treatment in the major urban centres, including Cape Town (4 per cent in 1996 to 11 per cent in 2004), Durban (10 per cent in 1996 to 25 per cent in 2004), and Gauteng (which includes Johannesburg and Pretoria, 11 per cent in 1998 to 19 per cent in 2004), as well as the rural province of Mpumulanga (14 per cent in 1999 to 24 per cent at the end of 2004).[158] Whether the treatment increase is possibly due to increased potency is unknown – South African cannabis is rarely tested for THC levels, and other factors, such as the declining age of the treatment population, may be responsible.

Thus although there simply is not enough data to prove that high potency cannabis is behind these trends, there is certainly a basis for a focused study of the association. As border controls stiffen, it is likely that a growing share of cannabis will be produced domestically, and in many countries this means indoors. But for most of the

Table 2: Share of primary cannabis users in the treatment populations of European countries

	1996	1997	1998	1999	2000	2001	2002	Increase
Denmark		11					27	145%
Germany			18				30	66%
Greece			6				7	17%
Spain		4					11	175%
France		11		14				27%[154]
Ireland		11			21			91%
Italy			8				9	12%
Luxembourg		4					11	175%
Netherlands			11				17	55%
Finland		18					23	28%
Sweden	7						30	329%
UK		8					10	25%

Source: EMCDDA Annual Reports 1999 and 2002

world, cannabis remains what it has been for years. What is changing is our understanding of the risks associated with the drug.

Our understanding of the impact on health is changing

The widespread use of cannabis is clearly related to the public perception that smoking herbal cannabis is virtually harmless.[159] It is widely understood that, unlike other drugs, death by cannabis overdose is extremely unlikely and few people develop cannabis habits that force them into street crime or prostitution. Cannabis is not associated with violent behaviour in many countries, and its role in accidents is vague in the public mind. The stereotypical 'stoner' character has become celebrated in popular media as harmless and somewhat endearing. Moreover, claims of purported medical benefits of cannabis have created the impression that cannabis may actually be beneficial to health.

Despite the good press, cannabis remains a powerful drug. Cannabis use affects virtually every organ system of the body, from the central nervous system to the cardiovascular, endocrine, respiratory, and immune systems.[160] Its impact on the psyche and behaviour of users can be considerable. Few casual users of cannabis know that cannabis dependence is a major issue when they first start experimenting with the drug.

There have been many recent reviews of the literature on the health impacts of cannabis. This discussion uses the one published by World Health Organization in 1997[161] as a point of departure, focusing on the major new findings since this review was conducted. The health effects of cannabis were also examined in a special double edition of UNODC's *Bulletin on Narcotics* in 1998.

Impact on the brain and behaviour

People smoke cannabis because it significantly changes their state of mind. The acute effects of cannabis use are an altered state of consciousness characterized by euphoria and relaxation, perceptual alterations, time distortion, and the intensification of ordinary sensory experiences.

But altered consciousness comes at a cost. Short-term memory and attention, motor skills, reaction time, and skilled activities are impaired while a person is intoxicated.[162] This has a potential impact on driving skills and involvement in accidents. Moreover, cannabis has the ability to produce dysphoric reactions, including severe anxiety and panic, and paranoia.[163]

In addition to its acute effects, cannabis use can produce long-term psychological problems. There is growing evidence that it can trigger latent psychosis and promote personality decompensation in diagnosed schizophrenics. Finally, some regular cannabis users find it difficult to stop using the drug, even when it is having adverse consequences for their lives.

Altered brain function can affect driving

The debate around cannabis and driving has been protracted. The World Health Organization states that there is sufficient consistency in the experimental evidence and studies among accident victims to conclude that there is an increased risk of accidents in people who drive when intoxicated with cannabis.[164] Subsequent research has pointed in both directions.[165]

The short-term impact of cannabis on cognitive and psychomotor performance has been recognized for many years. The effects include the slowing of reaction time, motor incoordination, impairment in short-term memory, difficulty in concentration, and slower problem solving. The effects are dose-related but can be demonstrated after relatively small doses (5-10 mg THC), even in experienced users.[166] But studies have conflicted on whether this impairment affects driving performance, with some suggesting that those intoxicated on cannabis recognise their condition and drive more carefully in compensation.

Research in this area has been complicated by the way the drug is metabolised. THC is fat-soluble, and quickly passes out of the blood into the brain and other organs, where it and its metabolites can remain for extended periods of time before slowly being excreted. Thus, the detection of cannabis metabolites in urine only serves to prove that the subject has used cannabis at some time in the recent past, not that intoxication was indicated at the time of the testing. And, unlike alcohol, even blood tests are not always reliable measures of the level of intoxication, particularly if they measure metabolites instead of THC. Perhaps partly as a result, the more recent studies in this area reach conflicting conclusions.

On the other hand, surveys that established recent use of cannabis by directly measuring THC in blood showed that THC positives, particularly at higher doses, are about three to seven times more likely to be responsible for accidents in which they were involved as compared to drivers that had not used drugs or alcohol.[167] And laboratory studies of driving by subjects given known quantities of THC have repeatedly found a connection between cannabis intoxication and bad driving,

as THC impairs cognition, psychomotor function and actual driving performance in a dose related manner. The degree of performance impairment observed in experimental studies after doses up to 300 mcg/kg THC were equivalent to the impairing effect of an alcohol dose producing a blood alcohol concentration of 0.05 g/dl, the legal limit for driving under the influence in most European countries.[168]

Progress in this debate might be assisted by standardising methodologies and finding more accurate ways of documenting current cannabis intoxication. One way of sidestepping the scientific problems is to ask the users themselves if they feel the perceptual distortions associated with cannabis consumption affect their driving. For example, one survey of regular cannabis users in Australia reported a quarter (25 per cent) of respondents felt their driving performance was impaired, reflexes and reaction times slowed, and their concentration affected when attempting to drive under the influence of cannabis.[169] The fact that over half of those polled in the national surveys on drug use in New Zealand say they never drive when under the influence of cannabis also demonstrates that cannabis users themselves feels that cannabis impairs their driving performance.[170]

Adverse psychological effects

The 'reefer madness' discourse of the early anti-drug campaigns in the United States appears to have undermined the credibility given to official pronouncements on the mental health risks of cannabis. This is unfortunate, because it is becoming increasingly clear that cannabis use can have serious psychological consequences. In the last eight years, several major reviews of the psychiatric problems associated with cannabis use have been conducted.[171]

With regard to the acute effects of the drug it is clear that cannabis can cause some dysphoric effects when used in high doses, including panic and delusions and 'cannabis psychosis'. In 1997, the World Health Organization found that the existence of such a disorder would require further research evidence. However, a recent review found that very high doses of cannabis can induce a brief psychosis, but this condition is extremely rare.[172] In contrast, another report found that an appreciable proportion of cannabis users report short-lived adverse effects, including psychotic states, following heavy consumption.[173]

With regard to long-term effects, several impacts have been hypothesised. One of the early attempts to describe the negative impact of cannabis on the mental state of users is the so-called 'amotivational syndrome', a personality deterioration with loss of energy and drive to work.[174] Again, the World Health Organization was unable to confirm the existence of such a syndrome based on the research in 1997. The state of evidence on amotivational syndrome largely comprises uncontrolled studies of long-term cannabis users in various cultures.[175] Evidence to the contrary is seen in cultures where cannabis is traditionally consumed to increase work output, such as South Africa and Jamaica. Due to the lack of a strong evidence base, the validity of this diagnosis remains uncertain.[176] It is probable that it represents nothing more than ongoing intoxication in frequent users.[177]

More worrying is the conflicting evidence around the claim that cannabis can either cause psychosis in vulnerable individuals or precipitate latent psychosis. The World Health Organization argues that there is clear evidence of an association between cannabis use and schizophrenia. One recent review of the literature determined that cannabis exposure is associated with an increased risk of psychosis, possibly by interacting with a pre-existing vulnerability for these disorders. A dose-response relationship was found between cannabis exposure and risk of psychosis, and this association was independent from potential confounding factors such as exposure to other drugs and pre-existence of psychotic symptoms.[178] Increased rates of psychotic symptoms were found to be associated with the development of cannabis dependence in young people (ages 18 and 21) in a longitudinal study of a birth cohort of 1,265 individuals in New Zealand, even when pre-existing symptoms and other background factors were taken into account.[179]

Since some schizophrenics 'self-medicate' with cannabis, it can be difficult to determine the lines of causation. An association between use of cannabis in adolescence and subsequent risk of schizophrenia was reported in a follow-up study of Swedish conscripts. The authors later extended the follow-up period and identified additional cases. Between the two studies, 50,087 subjects participated. Cannabis was associated with an increased risk of developing schizophrenia, consistent with a causal relation.[180]

Studies have also indicated that early use of cannabis is associated with the later development of psychosis. The Dunedin longitudinal study of adolescent cannabis use found that using cannabis in adolescence increases the likelihood of experiencing symptoms of schizophrenia in adulthood among psychologically vulnerable individuals. Moreover, the authors added that early cannabis

use (by age 15) confers greater risk for schizophrenia outcomes than later cannabis use (by age 18). This risk was specific to cannabis use, as opposed to use of other drugs.[181]

Aside from full-blown psychosis, cannabis is associated with other forms of mental illness. One study found that the prevalence of co-morbid psychiatric disorders and the severity of depressive and anxious symptoms increased progressively with the degree of involvement with cannabis.[182]

A link between cannabis and major depression was found in an epidemiological study of 6,792 young adults in the USA. The risk of major depression was moderately associated with the number of occasions of cannabis use and with more advanced stages of cannabis use.[183] These data were later confirmed in a review of cohort studies and well-designed cross-sectional studies in the general population. A modest but significant association was found between early-onset, regular cannabis use and later depression. On the other hand, some evidence was also found of an increased risk of later cannabis use among people with depression. This would support the hypothesis that people dealing with mental illness may turn to cannabis or other drugs in an attempt at self-medication. Little evidence was found for an association between depression and infrequent cannabis use. [184]

Furthermore, research based on the Christchurch cohort study (a 21-year longitudinal study of a birth cohort of 1265 New Zealand children) concluded that a significant link exists between the frequency of cannabis use and negative psychosocial outcomes, including property/violent crime, depression, suicidal behaviours and other illicit drug use. Especially, for the measures of crime, suicidal behaviours and other illicit drug use there was evidence of age-related variation in the strength of association with cannabis use, with younger users (14-15 years old) being more affected by regular cannabis use than older regular users (20-21 years old). The association between cannabis use and depression did not vary with age.[185]

A significant association between cannabis use and poor mental health was found in adolescents and young adults during the Dunedin long-term prospective study. Cannabis use and poor mental health were linked to low socio-economic status, a history of behaviour problems in childhood, and low parental attachment in adolescence. Mental disorder at age 15 led to a small but significantly elevated risk of cannabis use at age 18; by contrast, cannabis use at age 18 elevated the risk of mental disorder at age 21. The authors conclude that the primary causal direction leads from mental disorder to cannabis use among adolescents and the reverse in early adulthood. In contrast, alcohol use and cigarette smoking had independent associations with later mental health disorders.[186]

Current heavy cannabis use appears to have a negative impact on intelligence. In one study, IQ scores were examined before, during and after cessation of regular cannabis use to determine any impact of the drug on this measure of cognitive function. It was found that current cannabis use was significantly correlated in a dose-related fashion with a decline in IQ over the ages studied. Current cannabis use had a negative effect on global IQ score only in subjects who smoked five or more joints per week (heavy users). A negative effect was not observed among subjects who had previously been heavy users but were no longer using the substance. Smoking at least five joints weekly should not be interpreted as a definitive threshold, as subjects were at low risk for other factors that could have a negative synergetic effect on IQ score. Authors conclude that cannabis does not have a long-term negative impact on global intelligence, however they also identified the need for further investigation of the cognitive consequences of both current and previous cannabis use, especially a residual cannabis effect in more specific cognitive domains such as memory and attention.[187]

Cannabis use in early adolescence appears to have the ability to interfere with the normal development process. For example, one study pointed out that long-term cannabis users with early age of onset of their drug consumption (age 14 to 16) showed a specific deficit in visual scanning. A group of cannabis users (17 participants) compared to control group (20 participants) showed less effective search behaviour, including longer response times and more fixations at about the same error level. In sum, the results point to two loci of adverse effects: impairment in visual short-term memory, and less effective visual processing at a more strategic, top down controlled level.[188]

Furthermore, an early age of onset, rather than other potential predictors of test performance like present age, degree of acute intoxication or cumulative toxicity, was found to be the only factor predicting enduring effects on specific attentional functions in adulthood. Visual scanning undergoes a major maturation process around age 12-15 years and it is known to react specifically and sensitively to cannabinoids. A comparison of a group of young adult regular users of cannabis only with a group of non-users on a battery of tests of selective attention,

one of which is a test of visual scanning attention, showed that performance of cannabis users was selectively worse on this test, and the only feature that correlated with this impairment was the age at which adolescents began to use cannabis. Apparently vulnerable periods during brain development exist that are subject to persistent alterations by interfering exogenous cannabinoids.[189]

Cannabis and aggression

The argument is made by many that cannabis is a "soporific" and therefore the historical associations the drug has with violence are unfounded. However, this position seems to underestimate the importance of 'set and setting' in understanding the impact of any drug. Research has illustrated that the effects of a drug are not simply a product of its chemistry, but rather the interaction of this chemistry with the user's situation, mindset and his immediate environment when taking the drugs. So, while in the Western paradigm, cannabis is seen as drug inducing levity and sloth, this may not be the only interpretation that could be given to its physiological effects.

Depending on the dose, cannabis is generally classed as an 'hallucinogen', not a sedative or depressant. In many species the behavioural actions of low doses of delta-9 THC are characterized by a unique mixture of depressant and stimulant effects in the central nervous system. Heart rate is raised, body temperature drops, and thought processes are disturbed, for better or worse.[190] Some users refer to cannabis as a 'mood enhancer'.

There may also be a chemical basis for differing views of the subjective effects of cannabis on aggression. In South Africa to this day, African people see cannabis as a stimulant, which eases labour, fuels creativity, and can fuel violence.[191] One study notes that South African cannabis smokers seem to be particularly prone to psychosis with hypomanic features.[192] The cannabis native to this area is considered a pure sativa, with very little CBD (see Annex 1 for more on this cannabinoid),[193] which is believed to moderate the stimulant effects of the drug,[194] and which may possess anti-psychotic properties.[195] It may be that more attention needs to be paid the variability of the cannabis plant before generalizing about its subjective effects.

There is little in the Western scientific literature to support the contention that cannabis is strongly associated with violence, however. There is some research that does find a link between cannabis and violent crime. While these studies fall far from demonstrating that cannabis and violence are deeply linked, they do contradict the view that cannabis intoxication makes violence unthinkable.

New evidence for the gateway hypothesis?

One of the perennial debates surrounding the impact of cannabis is the so-called 'gateway' hypothesis: cannabis opens the door to the subsequent use of other drugs. Much of the early work in this area suffered from the *post hoc ergo propter hoc* logical fallacy. The fact that many users of other drugs report first using cannabis does not demonstrate a causal link between the two behaviours, and even a cursory look at the survey data illustrates the fact that most people who try cannabis do not go on to use other drugs.

More sophisticated recent studies indicate there may be more to this argument than its early incarnations suggested, however. One remarkable twin study was conducted in Australia. A national volunteer sample of 311 young adult identical and fraternal same-sex twin pairs was assembled. In each case, one twin had used cannabis before 17 years, while the other had not. Individuals who used cannabis by age 17 years were 2.1 to 5.2 times more likely than their co-twin to have experienced other drug use, alcohol dependence, and drug abuse/dependence. Controlling for known risk factors had only negligible effects on these results. The authors conclude that associations between early cannabis use and later drug use and abuse/dependence cannot solely be explained by common predisposing genetic or shared environmental factors. They argue that association may arise from the effects of the peer and social context within which cannabis is used and obtained. In particular, early access to and use of cannabis may reduce perceived barriers against the use of other illegal drugs and provide access to these drugs.[196]

A good share of cannabis users find that they cannot stop

Cannabis is not popularly associated with addiction. Traditionally, cannabis was regarded as a non-addictive drug because of the lack of observed physiological withdrawal symptoms. But the terminology around addiction changed with the publication in 1994 of the American Psychiatric Association's version four of its Diagnostic and Statistical Manual (DSM-IV). Rather than "addiction" the DSM-IV refers to "substance dependence," a condition that requires no physical withdrawal symptoms. The emphasis is now on the inability to end use despite the desire to do so and the problems that use causes in the lives of the dependent

person.[197] At the same time, new research indicated that heavy cannabis users do experience a clinically significant withdrawal syndrome, although its effects appear to be relatively mild.

The World Health Organization (WHO) cites research indicating that about half of those who use cannabis daily will develop dependence, which is roughly consistent with these findings. WHO also notes that the low number of users presenting for treatment relative to the size of the user population suggests that there is a high rate of remission even in the absence of treatment.[198]

A 2002 review of clinical and research experience concluded there is strong evidence demonstrating that cannabis can and does produce dependence. Clinical and epidemiological studies indicate that cannabis dependence is a relatively common phenomenon associated with significant psychosocial impairment.[199]

One comparative review of drug dependence risk found an estimated 9 per cent of lifetime users will develop cannabis dependence at some point. This risk, however, is less than many other drugs, including legal drugs. It is estimated that 15 per cent of alcohol users, 23 per cent of opiate users, and 32 per cent of tobacco users will develop dependence on the drug.[200]

Of the 9 per cent of those who try cannabis and go on to develop dependence, it is estimated that 80 per cent of these people will not seek treatment.[201] Despite this, globally, more people receive treatment for cannabis than for any other illicit drug group besides heroin. Just under a million people participate in rehabilitation programmes every year for help with their cannabis problems in the United States alone. As discussed above, the exact numbers may be misleading, because often convicted users may be given a choice between jail time and treatment. But even in countries where this policy does not hold, large shares of the total treatment population say their primary drug is cannabis.[202] In a number of African countries, cannabis exceeds even alcohol in demand for treatment.

Impact on the unborn

The World Health Organization points out that research in this area is complicated by sampling issues and questionable self-report data. Despite these, they conclude that there is reasonable evidence that cannabis use during pregnancy leads to reduced birth weight, possibly due to the same mechanism as tobacco smoking, foetal hypoxia. They conclude that there is little evidence to support the idea that cannabis smoking causes chromosomal or genetic abnormalities or birth defects. Most studies have confirmed the WHO conclusion by finding no relationship with either minor or major morphologic abnormalities.[203] However, the Atlanta Birth Defects Case-Control Study was used to identify 122 isolated simple ventricular septal defects (VSD) cases and 3029 control infants born during the period 1968 through 1980 in the metropolitan Atlanta area. Data on alcohol, cigarette, and illicit drug use were obtained through standardized interviews with mothers and fathers. A two-fold increase in risk of isolated simple VSD was identified for maternal self- and paternal proxy-reported cannabis use. Risk of isolated simple VSD increased with regular (three or more days per week) cannabis use. This is the first study to identify an association between maternal cannabis use and VSD in offspring.[204]

Three case-control studies have found associations between cannabis use during pregnancy and increased risk of cancer in children. The mothers of children with acute non-lymphoblastic leukaemia were 11 times more likely to have used cannabis before and during pregnancy then were mothers of controls.[205]

Mild but significant cognitive impairment in the offspring of mothers who smoked cannabis during pregnancy were found in the Ottawa Prospective Prenatal Study.[206] These data were confirmed through other studies. Prenatal cannabis use was significantly related to increased hyperactivity, impulsivity, and inattention symptoms at age 6[207] and age 10.[208] Furthermore it had a significant effect on academic performance: learning and memory of 10-year olds[209] and deficits in reading, reading comprehension, spelling, and overall lower rating on the teachers' evaluations of the children's performance.[210]

A follow-up study by of the same group between the ages of 13 and 16 indicated that those who had been exposed to cannabis *in utero* had poorer performance on tasks involving visual memory, analysis and integration.[211]

Cannabis smoking is not good for the lungs

As the World Health Organization concluded, smoking cannabis is not good for the lungs. Moreover, as cannabis smokers inhale more deeply, smoking a joint results in exposure to significantly greater amounts of combusted material per inhalation than smoking a tobacco cigarette. Of course, most cannabis users con-

sume fewer cigarettes than most tobacco smokers, but this may not be the case with those classified as 'chronic' consumers above.

Daily cannabis smoking has been clearly shown to have adverse effects on pulmonary function and produce respiratory symptomatology (cough, wheeze, and sputum production) similar to that of tobacco smokers.[212] Several studies have demonstrated that, even after limited exposure to cannabis smoke, airway inflammation develops. Examination of the lungs of cannabis smokers who smoked an average of only a few joints per day showed the same degree of airway injury as that detected in tobacco smokers who smoked 20 to 30 cigarettes per day. This underscores the importance of deep inhalation in enhancing the relative injury caused by cannabis smoke.[213]

Cannabis smoke is also a potential cause of cancer because it contains many of the same carcinogenic substances as cigarette smoke. A review of the basic science work concluded that the evidence clearly demonstrated the ability of cannabis smoke to produce mutations and cancerous changes.[214] In a recent review of all of the current evidence, one study concludes that there are good grounds for believing that chronic smoking of cannabis carries a significant risk of cancer in aerodigestive tract and lung.[215]

Cannabis is not good for people with heart prob lems

Acute cardiovascular effects of cannabis are dose-dependent tachycardia, which can lead to increased cardiac output and is generally associated with a mild increase in blood pressure. At high doses, sympathetic activity is inhibited and parasympathetic activity increased, leading to bradycardia and hypotension.[216] The cardiovascular effects of cannabis are not associated with serious health problems for most young, healthy users, although occasional myocardial infarction, stroke, and other adverse cardiovascular events are reported.[217]

Cannabis is not good for health

As noted above, the fact that the therapeutic effects of cannabis are being researched and legal changes are being made to accommodate this work may have obscured one simple fact: cannabis use is not good for health.

- According to a number of studies and many users, cannabis smoking impairs one's ability to drive a car and perform complex operations requiring motor skills.

- A significant share of cannabis users (about a fifth, according to one study) have experienced unwanted psychic effects during cannabis intoxication, including panic attacks, paranoia, and 'psychotic symptoms', and this risk of this happening may be increased by the growing availability of high potency cannabis.

- Numerous studies find an association between cannabis use and psychosis, and this effect is also likely to be influenced by the potency of the cannabis consumed.

- Despite early claims to the contrary, cannabis dependence is a reality: many people who use cannabis (several studies indicate just under 10 per cent) find it difficult to stop, even when it interferes with other aspects of their lives, and more than a million people from all over the world enter treatment for cannabis dependence each year.

- Research indicates that younger users, whose brains are still developing, may be especially vulnerable to the negative effects of cannabis.

- Cannabis smoking is bad for the lungs for all the same reasons that tobacco smoking is.

- There appear to be significant risks associated with prenatal exposure to cannabis and the effects of cannabis on the cardiovascular system.

Whether these negative effects are greater or lesser than other substances, including legally available substances, is of little relevance to the users whose lives are impacted by them. Despite its normalization in some countries and its occasional celebration in popular culture, it should be noted that cannabis is a powerful drug that has recently become more powerful in many parts of the world.

2.4. CONCLUSION

The world has failed to come to terms with cannabis as a drug. In some countries, cannabis use and trafficking are taken very seriously, while in others, they are virtually ignored. This incongruity undermines the credibility of the international system, and the time for resolving global ambivalence on the issue is long overdue. Either the gap between the letter and spirit of the Single Convention, so manifest with cannabis, needs to be bridged, or parties to the Convention need to discuss re-defining the status of cannabis.

The ability to make evidence-based decisions is undermined by our lack of knowledge about the nature of cannabis markets. Despite an academic bibliography that could run into several volumes, there remain large gaps in our understanding of where and how the plant is cultivated and consumed. This ignorance is particularly dangerous because many assume that cannabis is understood quite well, and base their decisions on shaky foundations.

At the same time, the drug itself is changing. High-potency sinsemilla produced in indoor cannabis factories represents genuine innovation in a substance that has been around for centuries. Its emergence highlights the fact that global illicit drugs markets are a moving target, and policies must be dynamic in order to address continual shifts and unexpected turns. There must be constant feedback between research and intervention if our approach to drugs issues is to be sound.

In several respects, cannabis is unique among illicit drugs. It is not dependent on transnational trafficking or organized crime to move from cultivator to user. Often, they are the same person, or at least socially related. There exist international advocacy groups promoting legal reform concerning the drug, a phenomenon not seen for cocaine or heroin. Medical use of the active ingredients, if not the plant itself, is championed by respected professionals. It is not surprising that national opinions on this issue have begun to diverge. It is essential, however, that consensus be regained, and that what is truly a global issue is again approached with consistency on a global level. After all, it is for precisely this that the multilateral drug control system was designed.

Annex 1 - The plant and the drug

Mankind has cultivated cannabis for so long that the origin of the plant remains unclear. Most experts suggest Central Asia, where vast fields of wild cannabis can be found today, as its likely birthplace. But the plant has proven as adaptable as humanity itself, and it has spread, both by design and opportunistically, to all corners of the globe.

There is evidence for early recognition of its intoxicating effects, but historically it has been most widely cultivated as a fibre crop. Hemp, the fibre derived from the long stalks of the cannabis plant, was especially useful for the production of rope and sailcloth due to its strength and water-resistant qualities. The potency of feral cannabis is generally quite low, so it was probably first consumed in its concentrated form, as cannabis resin. But all this is speculative, and it is entirely possible that the drug qualities of cannabis have been re-discovered several times in different locations. Like so much about cannabis, its history is obscure and diffuse.

Cannabis: Many plants in one

Cannabis is an annual plant, completing its lifecycle in a single season and dying after reproduction.[218] It grows well under similar conditions as corn does. It prefers temperatures between 14 and 27 degrees Celsius, but can withstand freezing temperatures for brief periods of time. In latitudes from about 30 to 60 degrees in the Northern hemisphere, seeds are traditionally planted between March and May, and the plant flowers between September and November – about a six-month growth cycle, with only one crop possible.[219] Closer to the equator, however, it is possible to manage two annual crops off the same plot[220] and it has been claimed that some tropical varieties will experience three or four growth seasons a year.[221] It prefers direct sunlight, as much as it can get. After the first six weeks, it can grow with little water as it possesses a powerful taproot, but it only flourishes with regular moisture. It requires well-drained soil or its roots will rot, however, so it does not grow well in clay.[222] While it can grow in difficult soil types, such as sand, it prefers loams rich in nitrogen, with a fairly neutral PH of between 6 and 7. Thus, while cannabis grows wild in a wide range of areas, rather specific conditions are required for optimal growth.

When intentionally cultivated, cannabis can be grown in most inhabited areas of the world, and cannabis survives in diverse climates by radically changing its shape, ranging in appearance from a weedy shrub to a six metre tall 'tree'. The plant's extreme adaptive morphology has led to much debate around the taxonomic classification of cannabis, and it was reclassified several times before being given its own family, the *cannabaceae*, shared only with the hops plant.

It is still being debated whether there is only one species of cannabis or several. The scientific debate has had little influence on illicit cultivators who agree that cannabis has two or three distinct varieties, based on clear differences in the way the plants taken from specific regions appear and grow, as well as their divergent subjective effects.[223]

- 'Cannabis sativa' is the term applied to both the genus as well as to the most widespread variety, a tall, conical plant typically found in warmer, lowland climates (Thailand, Mexico and South Africa, for example).

- 'Cannabis indica' is a squat, bushy, highland plant, putatively originating in northern India.

- 'Cannabis ruderalis' is a more recently (and less widely) recognized variety,[224] found growing wild in Central Asia. It is a small (less than 1 metre at full maturity), tough plant, able to withstand the harsh climate of the region. In some taxonomies, industrial hemp is also seen as a distinct species.

So different are these three that most casual observers would regard them as distinct plants. In addition to being different in appearance, strains of cannabis differ in their chemical composition. Cannabis contains over 400 chemicals, of which about 70 are chemically unique and are collectively referred to as cannabinoids. Delta-9 tetrahydrocannabinol (generally referred to simply as THC) is believed to be responsible for the most of the psychoactive effects of cannabis, although related chemicals are believed to also play a role. The precise way the various components of cannabis interact and influence the physiological and subjective effects of cannabis is a topic of ongoing research.

One of the most important secondary chemicals is cannabidiol (CBD), the biosynthetic precursor to THC, which converts to THC as the plant matures. This chemical is believed to 'moderate' the effects of THC, having a more sedative effect, as well as muscle relaxant

and anti-psychotic properties.[225] In general, it is believed that sativa varieties exhibit high levels of THC relative to CBD, while for indicas, the opposite is true. Users report pure sativas to produce a greater 'high' with less of a 'stoned' feeling: i.e., they have more of a cerebral and less of a somatic effect, which is in keeping with what is understood about the nature of their chemical compositions.

Aside from shape shifting, cannabis is unusual in several other ways, which are important to appreciate in order to understand cultivation practices. Cannabis is 'dioecious', which means each individual plant is either male or female. Male plants fertilise females by means of wind-borne pollen. This is of great importance to cultivators, as the most potent cannabis comes from the flowers of the unfertilised female plant. Early in life, male plants have as much or more THC as females, but at the peak of ripeness, females far surpass males, particularly if unfertilised. As will be discussed below, unfertilised female flowers are referred to as 'sinsemilla' (Spanish: without seeds), and today they constitute a distinct drug product.

The plant flowers over time or when it detects the coming of autumn, as evidenced in the shortening of days. This photosensitivity allows plants that germinated late to complete their life cycle in an accelerated manner. The exact photoperiod required to induce flowering depends on the genetics of the plant, but a 12-hour night period is enough to induce flowering in most, if not all, varieties. This allows indoor cultivators to decide when their plants will blossom.

In fact, all of the above unusual characteristics (variability, adaptability, dioeciousness, wind-borne pollination, photo-period linked fertility) have implications for illicit cannabis production, and it is only recently that these qualities have been exploited to their greatest potential. These developments, and the impact they are having on both the market and public health, will be discussed in the final sections of this chapter.

Cannabis: Many drugs in one

Several drug products can be produced from cannabis, falling into three main categories:

- 'herbal cannabis', the leaves and flowers of the plant, also known as 'marijuana', 'ganja', and a host of other names;

- 'cannabis resin', the pressed secretions of the plant, commonly referred to as 'hashish' in the Western countries or 'charas' in India.

- 'cannabis oil'.

Herbal cannabis is most popular in North America and most of the rest of the world, while cannabis resin is most popular in much of Europe and a few traditional hashish-producing regions.

Herbal cannabis

As is discussed further below, the nature of herbal cannabis in the developed world has changed in recent years. This is the product of three distinct processes:

- In the past, most users were content to smoke various parts of the cannabis plant, including the large leaves, but growing consumer consciousness has led to demand for cannabis comprised of just the flowering heads and small leaves, or 'buds', which are the strongest part of the plant.

- In addition, cannabis breeders from the United States, the Netherlands, and Canada have worked tirelessly to produce more potent cannabis. The strains they have developed are known by their brand names (e.g., 'White Widow', 'Afghan Haze', 'AK-47') or generically as 'skunk' in countries such as Australia, France, New Zealand, and the United Kingdom.

- The method for cultivating cannabis crops consisting exclusively of unfertilised female plants ('sinsemilla'), which are the most potent, has been re-discovered.

Today, the most potent forms of cannabis come from the unfertilised female (sinsemilla) flowers (buds) of plants bred for their high THC levels (skunk), and most premium products on the market today partake of all three of these characteristics. Of course, in most of the world, less refined products are the norm, but the technology is spreading through the mails and the Internet, and, as discussed below, premium products appear to be commanding increasing market share in the developed world.

Today, most, but by no means all, high-potency cannabis is produced indoors in developed countries, to service local markets or those in neighbouring states. Some of this indoor product is produced in soil and some is produced hydroponically (in a non-soil

medium, nourished through a nutrient bath). While premium cannabis can be produced more efficiently indoors and hydroponically, equally potent cannabis can be grown in soil.

Terms like 'buds', 'sinsemilla', 'skunk', and 'hydroponic' are often used as though they were interchangeable, and there are large areas of overlap. But each represents a distinct aspect of the ways high-end cannabis has changed in recent decades. Most high-end cannabis today consists only of buds. Most of this is sinsemilla, and, in developed countries, it is likely the beneficiary of breeding for high potency. Most high-potency sinsemilla is grown indoors, some of which is grown hydroponically. But even buyers of low-potency cannabis prefer buds today, there is some outdoor sinsemilla cultivation, and a good deal of indoor product is grown in soil.

In short, there are many herbal cannabis products today, though they are often discussed as though they are one and the same. This further adds to the confusion around the drug, and makes cross-cultural comparisons difficult.

Cannabis resin

In addition to the varieties of herbal cannabis, the drug can also be consumed in the form of a resin.[226] As the plant flowers, glands called 'trichomes' produce a sappy, resinous substance in which much of the cannabinoid content of the plant is concentrated. The resin may be collected while wet (by hand) or once the plant has dried (by sieving), and is generally formed into balls, sticks, or bricks. Dried resin must be heated or pressed to make it malleable. Sale-ready hashish differs in colour from sandy to reddish to black. It differs in consistency from putty-like to brittle and dusty. It can also be found in solution, as 'hash oil', but the market for this drug is not widespread.

In hand rubbing, workers remove the gummy resin from the living plants by running their hands over the flowering tops. The resin adheres to the skin and has to be removed by forcefully peeling it away and rubbing it into little balls, which are combined and moulded into shapes for marketing. Hand-rubbed hashish may have been the first way cannabis was consumed, and it represents a rather inefficient and labour-intensive means of gathering the drug. Hand rubbing today is concentrated in India and Nepal.

Hand rubbing is not to be confused with hand pressing. The dust-like product produced by sieving becomes malleable when heat and pressure are applied, and this can be done by hand or by machine in order to prepare it for storage and shipping. Sieving requires the plants to be dried first, which means an arid climate is essential. The resin and trichomes become powdery and brittle, and can be removed from the bulk of the plant matter by use of a screen and some percussive force. Traditionally, fabric is used as a screen and a basin or pot as a collection device. Light tapping produces the purest hashish, but greater quantities (including quite a lot of relatively inert plant matter) can be gathered by the application of more force. Thus, like olive oil, hashish is often "graded" depending on whether it is the first or subsequent "pressing". The powdery resin that precipitates is either gently heated or manually or mechanically pressed to make it malleable. Lower grades may be adulterated with a range of oils and inert or active bulking agents, although the European Monitoring Centre for Drugs and Drug Addiction says such additives are 'rare' in European samples.[227]

Both of these processes are highly labour intensive and somewhat wasteful, so it is not surprising that some cannabis resin users have devised more efficient technologies. Many of these were piloted in the Netherlands. The potency of the hashish they produce (*nederhasj*) is much higher than through traditional methods. A third sort of hash – "jelly hash" – has also emerged in recent years. This appears to be a combination of *nederhasj* and cannabis oil, with a soft consistency and very high THC levels.

Smoked, baked, or vaporised?

As there are many forms of cannabis, there are also many ways of consuming the drug. The amount of THC delivered to the user depends a lot on the method of ingestion, so trying to get a sense of how much is consumed requires knowing exactly how it was consumed. And each technique is subject to local variations.

Most herbal cannabis is smoked, but there are many ways of doing this, and each culture where the drug is introduced comes up with its own techniques and terminology. Perhaps the most popular technique is to make a kind of cigarette ('joint') using specialty rolling paper or other material (such as scrap paper or the leaves of local plants). In Ireland, for example, 98 per cent of people who used cannabis (herbal or resin) in the last month said smoking joints was one of the ways they consumed cannabis, with the second most popular response being pipes (7 per cent).[228] In Europe, a filter is often used, sometimes taken from a tobacco cigarette.

Cannabis is generally smoked with tobacco (in part to facilitate smooth burning) in Europe, parts of Asia, North Africa, Australia, and New Zealand, but this is unusual in most of sub-Saharan Africa and in the Western Hemisphere.

Other popular consumption techniques include:

- Pipes, including both specially made and tobacco pipes, often with a foil screen;
- Water pipes, hookahs, 'hubble bubbles' or bongs, in which the smoke is cooled by passing through a water chamber;
- Cigars, which have been emptied of their tobacco contents and refilled with cannabis (referred to as 'blunts' in the United States after Philly Blunts, a popular cigar brand);
- Vaporizers, modern machines that heat, but do not burn, the cannabis, releasing the THC into a plastic bag for inhalation;
- Makeshift devices, such as hollowed out apples, beer-can bongs, etc.
- More exotic techniques, such as the chillum (a large, horn-like, clay pipe used in India and Jamaica) and others.

Cannabis (typically resin) can also be eaten. THC is fat-soluble, and so cannabis can be included in a range of food products, and is typically consumed in baked goods. The subjective effects of eating cannabis are different from the experience of smoking, due to different metabolic processes involved in absorbing the drug. It is clear that the onset is slower and the duration longer when cannabis is eaten.

The amount consumed is related to the method of consumption. Vaporization is estimated to require twice as much cannabis, and eating four times as much, to produce the same effect.[229] Bongs are actually a more efficient way to consume cannabis than joints, as less material is lost in side-stream smoke. In Australia, surveys indicate that bongs are more popular with younger users (who were also more likely to prefer buds), while joints were more popular with older users. This suggests that younger users prefer to ingest more THC, or at least to ingest their THC more quickly, as they choose the best parts of the plant and the most efficient means of consumption.[230]

Though there is considerable variation, the typical bowl on a bong is large enough to accommodate about 1/20th of a gram of cannabis, and most bong smokers will reload their bowls several times in a consumption session. Purpose-made cannabis pipes tend to have much smaller bowls than tobacco pipes. A good example is the 'sebsi' used in Morocco to smoke 'kif', a cannabis/tobacco mixture. The bowl of a sebsi is typically very small. In contrast, the chillum used in India and Jamaica can hold vast amounts of cannabis, but these are commonly used by people who consume the drug religiously, not casual users.

The amount of cannabis found in a joint is dependant on whether tobacco is included,[231] whether a single or multiple rolling papers are used, and the strength of the cannabis concerned. Studies of cannabis joint size in the United Kingdom in the 1970s suggested between a seventh and a third of a gram per joint,[232] and more recent research in the UK[233] and Ireland[234] has found that this has changed little over the years. This may be due to the local consumption culture: British and Irish joints are typically mixed with tobacco and a single rolling paper is used, so there is little room for more cannabis.

Joints in the Netherlands are typically comprised of the tobacco of one cigarette with a small amount of high potency cannabis. Dutch coffee houses offer pre-rolled joints with a filter containing about 0.1g of cannabis and 0.9 g of tobacco, and Dutch street joints average around 0.25 g cannabis.[235] A study in the Netherlands showed life-sized pictures of joints to 400 frequent users and asked them to indicate which represented what they typically consumed. On this basis, 0.16 grams of cannabis per joint was found to be an average, or over 6 joints to the gram. This was much less than what users estimated they used when asked directly how many joints they thought they got from a gram – four, or 0.25 grams per joint.[236] This tendency to overestimate consumption should be kept in mind in evaluating other self-reported use data.

Figures from the United States are much higher, because tobacco is rarely used, low-potency Mexican cannabis dominates the market, and 'multi-skin' (using several rolling papers) joints are common. Estimates range from 0.4 g,[237] to 0.5 g[238] to 0.8 g[239] to an entire gram or more in a single joint.[240] Blunts can contain up to 3 g of cannabis,[241] but the product used is typically low-grade. Jamaican 'spliffs' (joints) are about 10 centimetres long, and were once said to contain as much as two or three grams of cannabis.[242]

Table 3: Variation in sizes of joints

Country	Cannabis per joint	Tobacco added?	Mostly sinsemilla?	Joints per gram
Netherlands	0.1 g - 0.25 g	Yes	Yes	4 – 10
United Kingdom/Ireland	0.15 g – 0.33	Yes	Yes	3 – 7
USA	0.4 g – 0.5 g	No	No	2
Canada	0.2 g – 0.33 g	Sometimes	Yes	3 – 5
Jamaica	2 g – 3 g	No	No	0.5 – 0.33

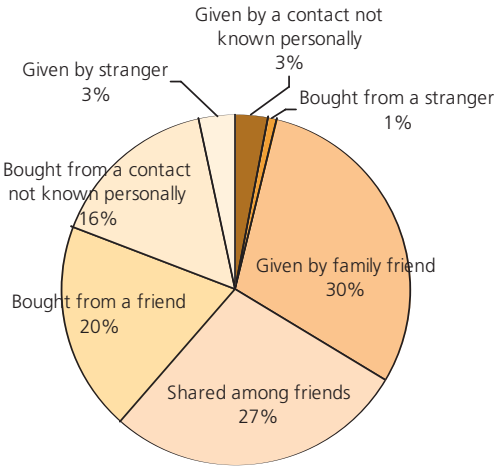
Cheap enough to share

For most users, a joint should not be seen as a unit of consumption because joints are usually consumed communally. In France, 82 per cent of occasional users (between one and nine incidents of use in the survey year) never consume the drug alone. Even among regular users (between 10 and 19 incidents of use per month), 20 per cent never consume alone, and only 20 per cent report they 'often' do so.[243] In New Zealand in 2001, only 4 per cent of users polled said they smoked alone during a 'typical' consumption session.[244] In the United States, a majority (57 per cent) of users said they got the cannabis they used most recently for free or that they shared someone else's cannabis.[245] In Ireland, the figure is 64 per cent.[246] And this phenomenon is not unique to casual users: surveys among regular users in the UK show almost all of them (96 per cent) share joints at least some of the time. [247] The tendency to share is related to the fact that an entire joint is too much for most casual users, a subject that is explored further below.

One of the reasons cannabis users can afford to be so generous is that, in most countries, cannabis is relatively cheap. In producer countries in the developing world, it is sometimes cheaper to get high on cannabis than to get drunk on beer. In South Africa, for example, the price of a matchbox full of cannabis buds is about four rand (just over 50 US cents), less than a bottle of beer in a bar. In Singapore, cannabis has been used in the past by worker communities as an inexpensive substitute for alcohol.[249] As might be expected, prices are cheapest in various poor producer countries (India, Lao People's Democratic Republic, Colombia, various African countries) and highest in the developed countries, especially where law enforcement is strong (Japan, Singapore, Sweden, United States,). The United States is one of the more expensive places in the world to buy cannabis, and an average United States price of US$300 an ounce (28 grams) sounds substantial, until it is pointed out that a dose sufficient to get a casual user high costs less than US$5. And despite enforcement efforts, the price of cannabis in the US has been relatively stable, between US$10 and US$20 per gram for small buyers throughout most of the 1980s and 1990s.[250]

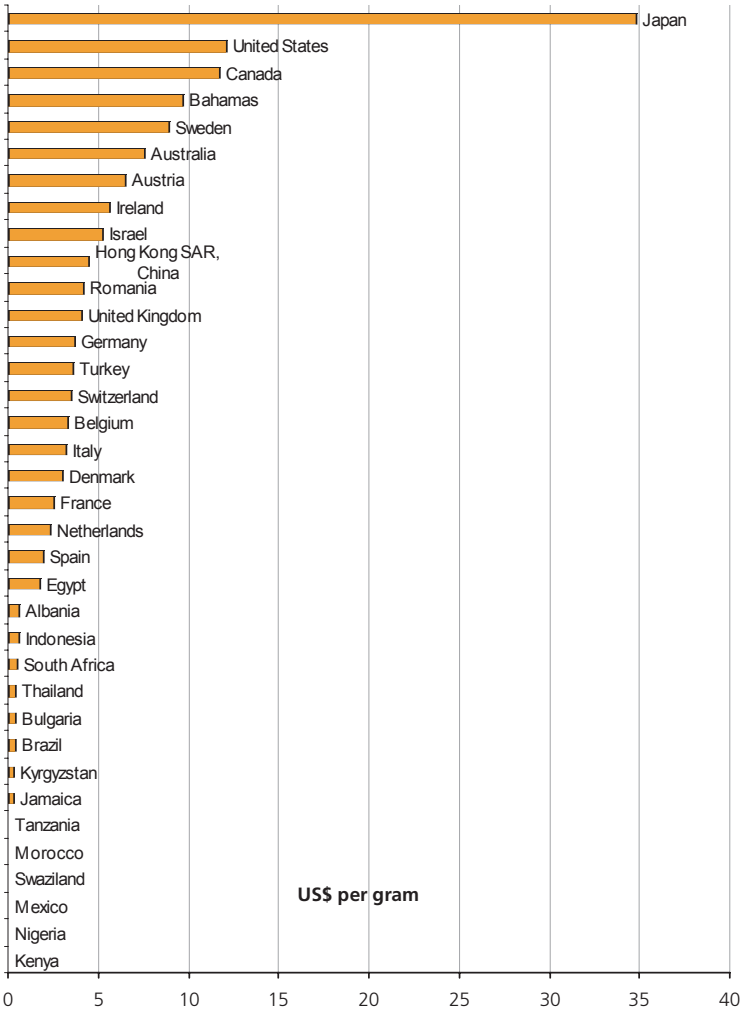
Cannabis is also used together in cocktails with other drugs. In South Africa, the 'white pipe' combination of methaqualone, tobacco, and low-grade cannabis is the primary way methaqualone is consumed. In Guyana,

Fig. 13: Where cannabis was obtained on the last occasion of use in Ireland



Source: National Advisory Committee on Drugs (2005) [248]

Fig. 14: Selected herbal cannabis prices



Source: Annual Reports Questionnaire Data.

Suriname, Haiti, Jamaica, Martinique, Dominica, Saint Kitts and Nevis as well as Guatemala – cannabis joints are occasionally spiked with cocaine base, with each country having its own name for this combination.

Annex 2 - Estimating yield

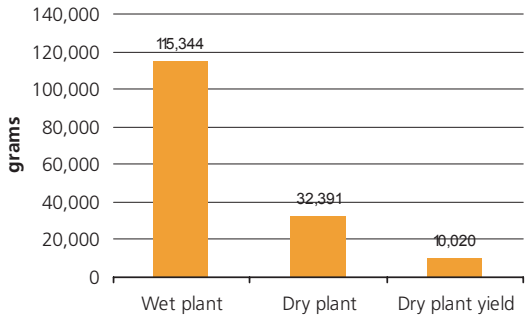
Various figures are used by law enforcement to estimate the amount of cannabis that could be produced on a given area of land, but the scientific basis of these estimates is often unclear. A number of factors need to be taken into consideration:

- Land dedicated to cannabis resin production will only yield about 4 per cent as much drug product by weight as will a similar sized field dedicated to herbal cannabis.
- Sinsemilla yields may differ from commercial yields, which allow for a lot more bulk material to be included in the product.
- For commercial yields, it is important to distinguish between the product as sold and the product used, the weights of which may be very different.
- Cultivation conditions, particularly the availability of water, can play a major role.
- The experience of the grower and the style of cultivation are key.
- If the climate is such that multiple crops are possible, this must be tallied, taking possible variation between seasonal outputs into consideration.
- If the land is situated indoors, a different set of rules applies.

Processing herbal cannabis from a whole plant in the field to saleable product requires drying the material and cutting away the parts not deemed suitable for sale. Drying results in a substantial loss of weight, with the dry plant weighing about 70 per cent less than the wet plant. After trimming, the wet plant to dry product ratio is said to be about 14 per cent.[251]

Empirically-based yield figures for sinsemilla can be drawn from the medical cannabis industry, where a scientific approach is taken to produce maximal yields of good quality under controlled indoor conditions with minimised input costs. The *Bureau voor Medicinale Cannabis* in the Netherlands is one such facility. Analysis of a recent crop would suggest that saleable material represents about 30 per cent of dried plant weight and about 8 per cent-10 per cent of wet plant weight. This is easily summarized in the ratio 10-3-1.

Fig. 15: Ratio of wet plant to dry plant to yield in a test crop of medical cannabis



Source: Bureau voor Medicinale Cannabis, Netherlands.

Given the expertise of the medical producers, these figures should thus be regarded as optimal sinsemilla yields. However, street product will likely contain more plant bulk – this is obvious in the case of non-sinsemilla products, because seeds are the densest part of the plant. Medical cannabis producers, concerned about fungal and mould growth, also tend to dry their product more than illicit producers, typically to about 10 per cent moisture content. Street samples generally contain more moisture, ranging from 12 per cent-16 per cent, but the impact on total bulk is minimal.[252] In the end, the 10-3-1 ratio (wet weight of plant – dry weight of plant – dry weight of product) is probably reasonable for sinsemilla.

For low-grade cannabis, most of the seeds (and perhaps more stems and leaves) are included. Inert, or relatively inert, portions are generally removed before smoking.[253] Seeds make up 23 per cent of the dry weight of the entire plant, and stems 43 per cent.[254] Most of the stem weight is not included in the street product, but most of the seeds are. Even if all of the stem were removed, seeds would still make up about 40 per cent of the dry product by weight. Allowing for some stem, it is possible that about half the weight of low-grade cannabis, as sold on the streets, is unusable.

Yields per plant and unit area are dependent on the degree of care given to the crop and the style of cultiva-

tion. Today, there are a wide variety of cultivation styles in evidence around the world. In many developing countries, people simply drop seeds and return months later to collect whatever develops, a practice that is virtually cost-free and thus very difficult to deter. In others, huge plantations of cannabis are cultivated. The threat of asset forfeiture has led cultivators in developed countries to plant on public lands ('guerrilla grows'). In still others, law enforcement pressures or an unsuitable climate have pushed production indoors, where inputs are higher but so are returns.

Within these styles, there is further variation. Some cultivation techniques emphasise dense plantings, while others focus on a smaller number of highly productive plants. It has been argued that, for the average home garden plot, cultivating a large number of small plants or a small number of large plants results in roughly the same yield.[255] Many indoor growers discuss their yields in terms of wattage – one pound per 600-watt high-pressure sodium bulb being a common rule of thumb. But this is not much help in comparing indoor and outdoor yields. The following discussion concludes that yields should be expressed per unit area (square metre or hectare) rather than per plant.

A single cannabis plant, given individual attention and wide room to grow, can be far more productive than the average plant cultivated in the dense conditions that typically accompany clandestine grows. Further, low planting densities quickly reach the point of diminishing returns for growers.[256] Using low-density, per-plant yields as a rule of thumb is likely to produce inflated estimates, and that laws that seek to regulate the number of plants grown, rather than the land area under cultivation, may be misplaced.

In practice, many traditional growers use much greater planting densities, especially on prime lands. In Morocco, to cite an extreme case, about 30 plants are cultivated per square metre in irrigated areas.[257] Similar densities are used in 'sea of green' indoor operations, where per-plant yields are in the neighbourhood of 10 g apiece,[258] far from the 'pound a plant' rule sometimes cited.[259]

In addition to plant density, cultivation style is clearly relevant in determining yield. Dense, indoor, high-tech plantings are more productive than dense, outdoor, traditional ones. Looking at some 35 yield estimates given by a wide range of different sources, a degree of consensus is discernable on the yields per square metre of the various cultivation strategies. Looking first at the outdoor situation, yields vary from as low as 47 grams per square metre for varieties grown without irrigation in difficult climates, to as high as 500 grams per square metre in well-tended gardens. An average of about 200 g per square metre outdoors has been said to be consistent with figures gathered in US court cases,[260] but conditions in the United States are generally better than those encountered in much of the developing world. For the purposes of the present analysis, a figure of 100 grams per square metre (or one metric ton per hectare) will be used for outdoor crops when cultivation style is unspecified.

All this highlights that cannabis is an extremely productive drug crop. One square metre of outdoor cultivation space is sufficient to supply a user with one 0.27 g joint a day (a reasonable size for a European user) for a year. A hectare could produce enough cannabis to supply 10,000 daily users. If all 162 million annual users smoked this amount (which is clearly not the case), global demand could be met by a production area of 162 square kilometres, an area about the size of Liechtenstein.

There is one important complicating factor, however. Some parts of the world appear to harvest multiple cannabis crops, and there is considerable confusion about this matter. In latitudes where there is variation in the seasons, there is usually one prime season (corresponding to the summer months) and up to three subsidiary seasons. In Lesotho, for example, it is often claimed that there are two or three harvests, but one of these may simply be the weeding of the male plants. Yield figures for off-season crops would be lower in all but the most generous climates, and some farmers may only deem the summer crop to be worth the effort. Thus, figures on the area under cultivation may vary seasonally for each area under consideration, and the yields per unit area would also vary by season. This considerably complicates yield estimates based on cultivation area.

In addition, it is nearly impossible to say how much cannabis is produced indoors in developed countries. According to a wide range of sources, indoor yields vary from a low of just over 300 grams to a high of just under 800 grams a square metre. These yields are produced by a number of different strategies, with considerable debate as to which is most productive. Individual plants can be freakishly productive, and this can be perpetuated, to some extent, by cloning. Overall, an average of about 500 grams per square metre per harvest seems to be confirmed by several sources. Some medical

providers cite much lower figures, however. Of course, the real productivity of indoor 'plots' is determined by the number of crops than can be produced in a year. As discussed above, a four-stage cultivation system allows three to six crops per unit of floor area per year. Thus, indoor crops are between 15 and 30 times as productive per square metre of cultivation space than are outdoor crops.

But indoor-grown cannabis, generally being sinsemilla of good seed stock, is also more potent than most outdoor-grown product. In the Netherlands, a strong correlation has been found between potency and price.[261] Data from the United States suggest that sinsemilla is worth three to 12 times as much as commercial grade cannabis per ounce.[262] This suggests that, in addition to producing greater bulk, indoor production is likely to produce much greater value. While input costs are also greater, there would appear to be a great deal of incentive to produce indoors in consumer countries, avoiding the hazard of cross-border trafficking, particularly in a climate of enhanced law enforcement.

The share of the market commanded by indoor, high-potency production is the subject of ongoing investigation. This is a key area of research, as it has implications for both enforcement and public health. But since the bulk of the global market seems to be supplied by traditional outdoor grows, a global production estimate can ignore this variable without hazarding too much error.

Annex 3 - Estimating individual consumption

Light tokers and chain-smokers

The estimated 162 million people who use cannabis do not all use it at the same rate. Some of them may have experimented with the drug once or twice, while others consume the drug on a daily basis. It is estimated that 10 per cent of people who try cannabis will progress to daily use for some period of their lives, with a further 20 per cent to 30 per cent using on a weekly basis.[263] This leaves, however, a large share of people whose use is less frequent. The prevalence of use tends to vary depending on the life-stage of the user. For example, about 60 per cent of French 19-year-old boys have tried cannabis, and, of these, more than one in three uses 20 times a month or more. This share drops greatly in later life stages.[264]

Understanding global cannabis demand requires the creation of a typology of users, and the obvious source for the data on which to base this typology is household and school survey data. Unfortunately, while the number of 'last-month' users is often a feature of the standard surveys, more precise questions about the number of days the drug was used are often lacking.

In the United States, the National Survey on Drug Use and Health (NSDUH) has been conducted regularly since 1972. According to NSDUH data, of the 25 million US citizens over 12 who used cannabis in 2003, 14.5 million of them said they had used it in the past month, or about 58 per cent. This is almost exactly what has been found in Australia, where 60 per cent of annual users consumed the drug in the last month.[265] A similar share is seen in the Netherlands (61 per cent), with slightly lower levels seen in France (52 per cent), Greece (53 per cent), Ireland (51 per cent), and Latvia (47 per cent).[266] A slightly higher level is seen in the United Kingdom (63 per cent).[267]

For a small share of these respondents, their use in the past month may have been the only time the drug was used in the past year. In other words, use in the past month does not mean that the drug was used every month of the previous year: 'past month use' does not mean 'monthly use'. This would suggest that the share of annual users that are also monthly users would be slightly lower than the figures discussed above. On the other hand, some heavier users might, for whatever reason, have missed out in the previous month. Data from the United States (discussed below) shows that 68 per cent of the annual respondents said they used the drug 12 or more times (i.e. on average, once a month). In Australia, National Drug Strategy Household Surveys have been held regularly since 1998. According to the 2001 data, 16 per cent of annual users over 14 consumed the drug every day, 23 per cent once a week or more, 12 per cent about once a month, and 49 per cent less often.[268] Thus it would appear, if anything, that the number of those who say they used in the last month may be slightly less than the number that used 'monthly' (12 or more times in the past year.). For the purposes of this discussion, 55 per cent of the annual users will be

Table 4: Breakdown of European cannabis users by frequency of use

Country	Year	Annual Prevalence	per cent used in 30 days	1 to 3 days	4 to 9 days	10 to 19 days	20+ days
France	2000	8.4	4.4	42.5	15.5	15.5	26.4
Greece	1998	4.4	2.3	37.7	27.3	15.6	19.5
Ireland	2002/03	5.1	2.6	40.9	22.3	14.3	22.5
Italy	2001	6.2	4.7	38	30.4	12.3	19.3
Latvia	2003	3.8	1.8	57.1	24.2	13.3	5.4
Netherlands	2000/01	6.1	3.7	41.5	21.1	13.8	23.6
Portugal	2001	3.3	3.3	33.7	23.8	19.2	23.2
Spain	2001	9.7	6.8	29.5	24.8	12.1	33.6

Source: EMCDDA, Statistical Bulletin 2004.

designated 'regular' (about once a month or more) and 45 per cent 'casual' (less than 12 times in the previous year).

Comparing the US and Australian figures shows a different breakdown in levels of use between the two areas. Only a third (32 per cent) of US users said they consumed the drug less than once a month, whereas nearly half (49 per cent) of the Australian users fall in this category. On the other hand, 16 per cent of the Australian users were daily consumers, compared to just 7 per cent of the US respondents. Taken at face value, Australian users seem to be taken to the extremes, with US users more likely to fall somewhere in the middle. If the categories were softened a bit, however, the fit is better. For example, if 'daily' use is considered five times or more per week, 18 per cent of the US respondents qualify, close to the Australian 16 per cent. New Zealand uses a softer standard for 'heavy' use: 10 or more times in the past month, but 20 per cent of the annual users fall into this category.[269]

Statistics from European household surveys as compiled by the European Monitoring Centre for Drugs and Drug Addiction show rates of cannabis use among those who used in the past 30 days. These figures show that between 1 per cent (Finland) and 7 per cent (Spain) of those who had used cannabis also consumed the drug in the last 30 days. Among past month users, between 5 per cent (Latvia) and 34 per cent (Spain) consumed the drug more than 20 days out of the last 20, and are designated by EMCDDA as "daily or almost daily users".

This figure would correspond to more than 240 days use in the past year, close to five times a week or more (260 days a year). Thus, we would expect the European figures for 20+ day last month users to be close to the 16 per cent to 18 per cent seen in Australia and the US, and, as the Table below shows, they are in several cases.

This analysis shows that survey data from a number of countries (the US, Australia, France, Greece, Ireland, Italy, and the Netherlands) indicate that past month users comprise about half of annual users, and that 'daily or almost daily' users comprise between 10 per cent and 20 per cent of the annual user pool, with a mean, median, and mode of 14 per cent.

Sources from a wide range of countries suggest that about 14 per cent of annual cannabis users are daily users, a higher figure than many would expect. If these figures could be generalized to the total global population, this suggests that about 22.5 million people use cannabis daily or near-daily, with the other 138.5 million using it less often. This figure is important because only at the level of daily or near-daily use does tolerance develop, and this has an impact on the amount of cannabis used.

How much cannabis in a dose?

Like all drugs, cannabis dosage is highly dependant on factors such as body weight, individual metabolism, and tolerance, and there is limited material on what constitutes a 'dose' among recreational users. There are two ways of approaching this problem, both of which are pursued below. One is to determine, on the basis of scientific testing, how much cannabis a user needs to consume to receive the desired effects. Due to the extreme variability in potency, however, cannabis dosages would need to be expressed in the amount of THC absorbed by the system, rather than the weight of the product consumed. The second approach would be to look at actual use patterns based on survey or other data.

Table 5: Ratios of annual to more frequent users

Country	Share of respondents users who are annual users	Share of respondents who are past month users	Share of annual users that are monthly users	Share of monthly users who are daily users	Share of annual users that are daily users
France	8.40%	4.40%	52%	26%	14%
Greece	4.40%	2.30%	53%	20%	11%
Ireland	5.10%	2.60%	51%	23%	12%
Italy	6.20%	4.70%	76%	19%	14%
Netherlands	6.10%	3.70%	61%	24%	15%
Source: Calculations based on EMCDDA data.					

The question of what an 'average' user consumes is complicated by the issue of tolerance. While the extent of tolerance has not been precisely quantified, it appears to build within a few days of chronic use and dissipate just as fast.[270] In other words, tolerance is not an issue for anyone but daily or near-daily users, but there are likely to be stark differences in the dosage levels, and consequently the consumption levels, between these two groups.

Determining dosage levels in a laboratory setting is complicated by a number of factors. For example, testing of blood THC levels of those known to have consumed a set quantity of cannabis demonstrates that smoking technique makes a considerable difference in the amount of THC absorbed. When smoked, only between 15 per cent and 50 per cent of the THC in a joint is absorbed into the blood stream, but experienced users are able to access about twice as much THC as casual users, due to superior inhalation technique.[271]

Using this absorption range, smoking an average joint in the United States (0.5g of 10 per cent THC[272]) would result in the ingestion of 7.5mg to 25mg of THC. When smoked, the World Health Organization (WHO) says that only 2mg to 3mg are sufficient to produce the desired effect in most people.[273] Using the WHO standards, this would mean consumption of perhaps 10 per cent to at most 40 per cent of an average joint in the United States should be sufficient to produce the desired effect. This represents a 'dose' level of between 0.05g and 0.2g.[274] Of course, threshold levels are often exceeded,[275] but these guidelines are meant to capture the experience of the average user.

In other words, one average joint represents enough cannabis to serve between two and ten people, according to WHO standards. This may be one reason why cannabis is frequently consumed in groups, or a joint is smoked in more than one consumption session. Higher quality cannabis would obviously require less of a joint to be smoked. Thus, however convenient the unit, a joint should not be considered a 'dose'. Consumption of an entire joint in a single setting by a casual user would be rare, rather like a casual drinker consuming an entire bottle of wine. Cannabis of reasonable potency is actually more like spirits: just a few 'shots' are enough to produce the desired level of inebriation.

As cannabis is usually consumed communally, with a single joint being passed around, there is almost no lower limit to the amount consumed by casual users. In other words, survey respondents who say they have consumed cannabis in the last year (especially novice users) may have only had a toke or three on one or more occasions. The quantity consumed by these individuals in terms of the weight of the drug product is minimal.

This level of use is reflected in the New Zealand survey data, which is unique in asking users how much they consumed on each occasion they used the drug, and allowing for specification of amounts lower than one joint. In 2001, the average annual user reported smoking six-tenths of a joint. This average includes the 20 per cent of the annual users who were classed as 'heavy' smokers (using 10 or more times in the last month), so modal values for occasional users would be much less. The New Zealand surveys also ask about sharing joints, the results show that nearly all use takes place in groups of two or more. In 2001, only 4 per cent smoked alone during a 'typical' consumption session, while 14 per cent shared with one other, 29 per cent with two others, 24 per cent with three others, 17 per cent with four others, 6 per cent with five others, 3 per cent with six others, and 2 per cent with seven others. A large share (45 per cent in 2001) never bought the cannabis they consumed, and another significant part (26 per cent) received at least some of their cannabis for free.[276] This is consistent with figures from France, the US, and Ireland.

While there is virtually no floor on the amount of cannabis that might have been used by an annual user, it also seems that the ceiling on use is very high. Unlike other drugs, it is impossible to die of an 'overdose' of cannabis. Experienced smokers can use the drug continuously if there are no social barriers to their use. Those who grow their own supply may also circumvent financial constraints. For these users, the only ceiling on their use is the time it takes to prepare and consume the drug.

Many daily users have rules around when and where they will consume, generally restraining their use to leisure time. Surveys of users in New Zealand show 95 per cent of annual smokers polled said they never used the substance at the workplace, so employment may form a major impediment to constant consumption.[277] A study of users in Amsterdam, where the drug is widely tolerated, found that declining to consume at work was the single most commonly followed 'rule' around consumption, and that 27 per cent of their sample of experienced users adhered to this rule, while a further 20 per cent abstained from smoking during the day, and 15 per cent abstained during the morning.[278] In France, just under a quarter (24 per cent) of 'heavy' (20 times a

month or more) users only 'sometimes' or 'never' consumed in the morning or afternoon.[279] Thus, a reasonable division could be hypothesized between daily users who have a joint or two in the morning and/or evening and those whose lifestyles allowed them to be continuously intoxicated. These 'chronic' users need to be distinguished from other daily users, as amount of cannabis they consume is much greater.

One source of information on dose levels for heavy users is the literature on medical use of cannabis. There is a great deal of contradictory information on what constitutes a 'normal' use pattern among medical cannabis recipients. Using the prescription guidelines for synthetic THC as a guideline, users required to be constantly under the influence of cannabis would need to smoke the equivalent of between two and ten standard 0.5 g joints of good potency daily.[280] Some reports have suggested higher amounts, however. One study of four long-term medical cannabis patients found consumption levels of between seven and nine grams a day, although this dosage was the product of years of constant use, and lower consumption levels had been adequate at earlier stages.[281]

Unfortunately, the ability to generalize actual medical use patterns to the public at large is limited because medical users tend to have access to better quality cannabis than the general public.[282] It seems likely that heavy users without access to medical cannabis would use more potent product as well, and would be more likely to grow their own, but the extent to which this is true is unclear.

Another source of information on user habits is the regulated industry of the Dutch coffee shops. According to the Dutch Ministry of Health, Welfare, and Sports, the 600,000 users of cannabis products in the Netherlands consume an average of two grams per week per customer.[283] Of course, this average consumption level obscures great variation in individual use levels, and, like medical cannabis, the quality of this product is likely to be much better than that available to users in other parts of the world.

Field accounts of use levels among non-medical regular users vary in quality, and the question of sampling is always an issue. The Independent Drug Monitoring Unit (IDMU) in the United Kingdom makes use of a sample of 'regular' users gathered at "pop-festivals and pro-cannabis rallies… subcultural magazines, snowballing, via direct mailings to pressure groups, and at other events." This sample is clearly not representative of annual cannabis users, but does give information on the upper end of the use scale.

The IDMU notes that even within this pool, the majority of the regular users consume relatively small amounts of the drug, with a mean consumption of 1 g per day. But among daily users, the average was over six joints a day, with some examples of much heavier use.[284] Other research in the United Kingdom also suggests that daily users may consume as much as five joints a day.[285] Informal interviews conducted in connection with this study with a number of employed daily users suggest a monthly consumption level of about 28g, enough cannabis for about two joints a day.[286]

One qualitative study of drug users in Milan found that while most users consume only occasionally, daily users smoke between two and five joints, or one to two grams of cannabis, a day. One dealer interviewed in connection with the study, however, claimed that at one point in his life he consumed up to 20 grams in a day.[287] In Costa Rica, a study of 41 long term users found that 10 joints a day were smoked, but the total weight of the cannabis was only 2 g with an average THC level of 2.2 per cent.[288] One study of long-term, regular[289] users in Australia found a median use pattern of two 'standard' joints a day (50 per cent smoked between one and four joints a day), but there were some stark outliers. Overall, one-third smoked cannabis throughout the day, while the rest restricted themselves to evenings or other times.[290] There are some studies that suggest much higher levels of use, but the credibility of these accounts has been questioned.[291]

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272 Average of samples submitted to the Marijuana Potency Monitoring Project for the first three quarters of 2004.
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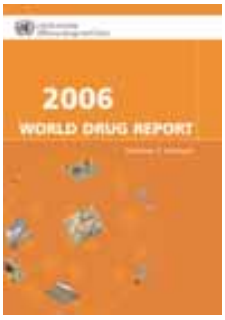

Some 200 million people, or 5 percent of the global population age 15-64, have used illicit drugs at least once in the last 12 months. Among this population are people from almost every country on earth. More people are involved in the production and trafficking of illicit drugs and still more are touched by the devastating social and economic costs of this problem. Partially a consequence of its pervasiveness and partially a consequence of the illicit and hidden nature of the problem, reliable analysis and statistics on the production, trafficking and use of illicit drugs are rare.

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